DUKE UNIVERSITY LIBRARY

AIR POWER

HISTORIAN

Credit: U. S. Air Force

An aerial view of the major school complex of the Air University, Maxwell Air Force Base, Alabama.

VOLUME V • NUMBER 4 OCTOBER 1958

THE AIR FORCE HISTORICAL FOUNDATION

THE AIR FORCE HISTORICAL FOUNDATION

The Air Force Historical Foundation, established in 1953, is an independent, incorporated body, operating under the sanction of law as a nonprofit organization.

The Foundation is dedicated to the preservation, perpetuation and appropriate publication of the history and traditions of the United States Air Force and its predecessor organizations, and of the men whose lives have been devoted to that Service.

The business and objectives of the Foundation are educational and literary; to preserve the annals of American air power, especially the annals of the United States Air Force, its components, subsidiaries and affiliates, and of the individuals of whom they are composed; to disseminate to the public and to posterity accurate and complete historical information on air power subjects; and to preserve in a central repository significant materials depicting the history, culture, and traditions of the United States Air Force and the organizations which preceded it.

The government of the Foundation is vested in a board of twenty-four elected trustees, who serve a four-year term, and the following persons who are ex-officio members: The civilian head of the United States Air Force; the military head of the United States Air Force and his immediate predecessor; the commander of the Air University and the superintendent of the Air Force Academy.

Election of trustees is by ballot and each member of the Foundation is eligible, and is invited, to vote for members of the Board.

The Foundation is maintained wholly by individual subscriptions and contributions. Civilians and military alike are invited to join one of the following categories of membership:

1. Annual	$3.00
2. Life	$100.00
3. Contributing	$100.00 (annually)
4. Patron Life	$1000.00 to $5000.00
5. Benefactor Life	$5000.00 or above

(All contributions are deductible from income tax.)

All members receive the quarterly publication, *The Air Power Historian,* whose guiding editorial policy is the belief that our civilization cannot survive if the peoples who enjoy its blessings display weakness in conviction and courage.

HISTORY — CULTURE — TRADITION

THE AIR POWER HISTORIAN

VOLUME V • NUMBER 4 • OCTOBER 1958

THE AIR FORCE HISTORICAL FOUNDATION

OFFICERS

President
Gen. Benjamin D. Foulois (Ret)

1st Vice President
Lt. Gen. Idwal H. Edwards (Ret)

2nd Vice President
Major Alexander P. deSeversky

3rd Vice President
Mr. Gill Robb Wilson

Treasurer
Maj. Gen. St. Clair Streett (Ret)

Secretary
Lt. Gen. Walter E. Todd

Executive Director
Maj. Gen. Orvil A. Anderson (Ret)

BOARD OF TRUSTEES

Mr. Richard Boutelle
Maj. Gen. James E. Briggs
Maj. Gen. R. L. Copsey (Ret)
Dr. W. F. Craven
Maj. Alexander P. deSeversky
The Hon. James H. Douglas
Lt. Gen. Ira C. Eaker (Ret)
Lt. Gen. Idwal H. Edwards (Ret)
Gen. Benjamin D. Foulois (Ret)
Lt. Gen. Robert W. Harper (Ret)
Gen. George C. Kenney (Ret)
Lt. Gen. William E. Kepner (Ret)
Gen. Laurence S. Kuter
Mr. Marvin W. McFarland
Gen. T. DeWitt Milling (Ret.)
Gen. Earle E. Partridge
Brig. Gen. Hume Peabody (Ret)
Dr. Albert F. Simpson
Maj. Gen. Jacob E. Smart
Brig. Gen. Dale O. Smith
Gen. Carl A. Spaatz (Ret)
Mr. James H. Straubel
Maj. Gen. St. Clair Streett (Ret)
Lt. Gen. Dean C. Strother
Gen. Nathan F. Twining
Gen. Otto P. Weyland
General T. D. White
Mr. C. V. Whitney
Mr. Gill Robb Wilson

EDITORIAL BOARD

Gen. Ramsay D. Potts, Jr., USAFR
Attorney at Law, Chairman
Major Alexander P. deSeversky
New York City
Dr. Eugene M. Emme
of Civil and Defense Mobilization
Mr. Steve Leo
Washington, D. C.
Col. Archie R. Lewis
Air War College
Col. John A. McCann
Air War College
Mr. Marvin W. McFarland
Library of Congress
Dr. Stefan Possony
Foreign Policy Research Institute
Georgetown, University

CONTENTS

210 AIR UNIVERSITY MISSION
by Lieutenant General Walter E. Todd

211 THE AIR COMMAND AND STAFF COLLEGE FACING THE GROWING NEED FOR COMPREHENSION
by Major General Lloyd P. Hopwood

221 THE STORY OF THE AIR WAR COLLEGE
by Colonel Ralph L. Michaelis, USAF

234 AFROTC—(AIR FORCE RESERVE OFFICERS' TRAINING CORPS)
by Major General T. C. Rogers

245 HISTORY OF THE SCHOOL OF AVIATION MEDICINE, 1918-1958
by Jean Evans

262 THE AIR FORCE EXTENSION COURSE INSTITUTE
by Colonel John A. McCann, USAF

269 AIRMAN'S BIBLIOGRAPHY
Book Reviews
Recent Books
Recent Articles

274 NEWS ITEMS

277 LETTERS TO EDITOR

It is the policy of *The Air Power Historian* neither to endorse nor subscribe to the views expressed in the articles it presents. Many events in history must perforce remain controversial by reason of the multiplicity of interpretations given these events by those who participated in them, or have studied them from hindsight. Appropriate articles are invited for consideration.

Published by **The Air Force Historical Foundation,** Maxwell Air Force Base, Montgomery, Alabama

Annual Subscription $3.00 Issued Quarterly

Second-Class Mail privileges authorized at Montgomery, Alabama

Copyright © 1958 by—
THE AIR FORCE HISTORICAL FOUNDATION

AIR UNIVERSITY MISSION

By LT. GEN. WALTER E. TODD

General Todd crests a broad and varied military career as he takes over command of Air University. He faces the challenge in this educational endeavor with an extensive experience in the professional military field, covering key positions in both command and staff assignments. He comes well qualified to meet that challenge.

For his meritorious service he has been awarded the Distinguished Service Medal, Legion of Merit, Distinguished Service Cross, and Air Medal. He is a rated Command Pilot, Combat Observer and Techincal Observer.

Any story of the impact of the air-space age on military operations would be incomplete without some consideration of professional military education. The relative effectiveness of any weapon in any age has been measured in terms of the technological advance incorporated in the weapon and the ability of the military to employ such weapon in the proper manner, in the right place and at the right time. Technological advance has never been more revolutionary in the history of the world than in the past ten to fifteen years—what a challenge this poses in the field of professional military education!

Our educational system must develop leaders who will have an understanding of the nature of modern war in all its complexities, and who will be both broadly and specifically capable of making the best use of all weapons and resources available to the nation. This is the job of Air University.

Selected officers, at successive levels of age and grade, grapple realistically in Air University with the underlying principles of conflict—past, present and future. Only through the mastering of these principles can our students measure up to the leadership requirements of today and tomorrow.

THE AIR COMMAND AND STAFF COLLEGE
FACING THE GROWING NEED FOR COMPREHENSION

By MAJOR GENERAL LLOYD P. HOPWOOD

"From a little acorn, the mighty oak tree grew."
It is an American tradition and heritage to savor the successes and accomplishments of "little acorns" who grow into "mighty oaks." American military history, as well as the military histories of the world, is filled with examples of outstanding leaders who seemingly burst their way through the ranks to the top-notch positions of leadership. In the days of the numbered few in the military such achievements were more common than they are today, because of the sheer number of individuals filling the various categories of ranks.

The constant pressure of high selectivity demands the best of individuals. Selectivity, to a large degree, is oriented toward the selection of future leaders and commanders. To this end the school system of the Air University focusses much of its attention—the development of leadership qualities. Having been commandant of the second ranking school in the Air University system for about five years, Major General Lloyd P. Hopwood here presents a pertinent and philosophical development of the Air Command and Staff College, embodying the principal schools of Air Command and Staff School, Squadron Officer School, the Academic Instructor Course, and the Air Warfare Systems Course.

General Hopwood was born in Honolulu, Hawaii on 19 December 1907. He graduated as a 2nd Lieutenant from the flying school system at Randolph and Kelly Fields in 1933. After a couple of short tours, he was returned to inactive status in November 1934. He was recalled in May 1936, assigned to the 18th Pursuit Group at Wheeler Field, Hawaii, and was given a regular commission on October 1, 1936. He later served at Randolph Field, the Ryan School of Aeronautics and the Flying School at Hemet, California. He was at Moffett Field when World War II broke out. In January 1943 he was transferred to Headquarters of the Army Air Forces in Washington and served in various functions until April 1945. He was then assigned to the Eighth Air Force and assumed command of its rear echelon in July 1945. He went to Okinawa in September as Assistant Chief of Staff for Personnel, and three months later was promoted to Chief of Staff. He returned to the U. S. in July 1946 and was assigned to the Staff of the newly formed Air University at Maxwell Field. He entered the Air War College class in 1948, and on graduation returned to Washington as Deputy Director of Personnel Planning. In June 1953 he returned to Maxwell to assume command of the Air Command and Staff College. He relinquished this command in July 1958.

I suppose that any officer entering a new assignment seeks a greater depth of guidance than can be found in the printed mission or an organizational chart. In my case, my philosophy and efforts were directly influenced by three officers under whom I have served and from whom I accepted a great deal of the challenge with which I faced my responsibilities as Commandant of the Air Command and Staff College.

First of these was the late General Henry H. Arnold. I am not sure why I did it now, but sometime back in 1946 I heavily underscored a paragraph in General Arnold's third and final report to the Secretary of War. It is a passage I have used many times since and quote it here from memory. "National safety would be endangered by an Air Force whose doctrines and techniques are tied solely to the equipment and processes of the moment. Present equipment is but a step in progress, and any Air Force which does not keep its doctrines ahead of its equipment, and its vision far into the future, can only delude the nation into a false sense of security."

A second source of guidance came from the founder of the Air University, the late General Muir S. Fairchild in the following words:

> "To those of us who are primarily concerned with military aviation education, many lessons and implications of World War II have become clear. We know, first of all, certain characteristics which the responsible air officer of the future must have. His thinking must be clear, vigorous, objective, independent, and on a global scale. He must be flexible in his approach to problems and in his reaction to unusual and unforeseen situations. He must have the courage and intellectual curiosity to try new things and new methods. He must guard rigorously against believing that he has learned all the answers to future war, against building up resistance to change, against taking the easy course of accepting answers from the past instead of the infinitely more difficult course of digging them out of the future."

The third influence came from the dynamic leadership of the first Commandant of the Air War College, Major General Orvil A. Anderson who constantly and even belligerently dared us not to think.

A fourth and underlying influence was a boundless faith in the officers of the Air Force with whom it has been my privilege to work. Here I had the precedent of the careers and contributions of the one time lieutenants and captains on the faculty of the old Air Corps Tactical School. With little in the way of effective hardware and never a shot in anger for background, they conceived, fought for and ultimately produced the dominant air power of World War II.

Today, the typical Command and Staff School class represents some 12,000 years of seasoning in the field of air power, several million flying hours and several hundred thousand hours of air-combat in the crucibles of two wars.

Even in the Squadron Officer School the total experience of a typical class exceeds the combined experience of the officer strength of the Air Corps at the time of Munich.

Since all of these underlying guidelines point up the urgency of looking to the future, a first assessment might be that the following monograph is not appropriately a part of a journal dedicated to the historical greatness of Air Power.

After a little consideration, however, it seems apparent that our best hope that *The Air Power Historian* will continue to be published by Americans and

not by Communists is to be right in what we are doing in the professional education of our airmen.

Some tangible signs of correctness can be cited. The Command and Staff School is again a generalist program of a full academic year for board selected officers. The Squadron Officer School has been lengthened and is being actively sought by good, career-minded officers. The one time Weapons Course has transitioned into the Air Warfare Systems Course and is projecting actively into the future of missiles and space. All are being generously supported by the operational commands of the Air Force.

Factors For Consideration

The issues to be faced are complex. It is not necessary to dwell upon the fact of our free world leadership and the role of air power in our national policy. It is of importance that we recognize and learn to live with the fact that modern speeds with modern munitions have effected a revolution in which war can complete its decisive phase at a rate faster than the techniques that have been habitually employed by the political echelons to control its outcome. It is not yet the common consensus that realistic and effective air strategy and grand strategy must become a single entity if we are to achieve our objectives—even though this must be recognized as axiomatic as a base on which to look ahead.

There is another side to the coin which also produces problems. In the period of H-hour forces and floating D-Days, our deterrent capability demands the constant and recognized capability for decisive action on every hour of every day from now to infinity. It is an anomaly that the more successful we are in today's deterrent, the more urgent it becomes that we focus on the problems of tomorrow's deterrent or gaps of complacency could occur.

Before World War II with no H-hour capability and no H-hour responsibility and surrounded by adversity, it was easy for the airman to look ahead because in any other direction lay only frustration. Today things are quite different. Not only is the obligation for instant readiness involved, but so is officer aptitude and attitude. Today's officer, and particularly if he is in the grade of captain, major or lieutenant colonel, is in a severely competitive position. The problems of the World War II hump, limited promotion vacancies, and very rugged selectivity ratios all became very personal ones. By and large, if he is intelligent enough—has promise enough to come to school—he must be very much concerned with the quality of his current effectiveness reports. Understandably, he is very much interested in what a school can give him to help him do today's job better. So are we, of course, but this situation can conflict at times with the longer range, future vision and imagination. The old business of "keeping your bowels open and your mouth closed" that has never been a severe problem in the Air Force shows periodic signs of becoming one.

For performance in the present and immediate future our curricula provide substantial coverage. Ability to speak and to write receive heavy emphasis. Staff and command functions, organization and techniques are covered as are programming, management and current employment doctrine. All are combined with personnel, logistics, intelligence and all other functions into periodic problems and exercises to test and validate the principles involved.

Beyond this, and looking to the future, we at one time believed that the creation of an atmosphere in which officers could think was enough. This is a perfectly good process but, with-

out direction or guidance the end product may not be specific enough. Although it is not spelled out in exactly the fashion in which it is presented here, the format for the kind of thinking we try to achieve breaks down into four related but fairly distinct parts.

Format For Thought

First comes the isolation of facts and logic from emotion—the background for comprehension and understanding.

Next in line comes the business of using comprehension, facts and logic to formulate ideas and concepts for the future—the application of responsible imagination.

Third comes the element of feasibility testing the product of individual ideas—the transition from independent thought toward the corporate convictions of future doctrine.

Last, most difficult, and perhaps most important of all is the derivation of a thinking, responsible dedication—a readiness and willingness to apply individual capabilities without reservation to the echievement of the Air Force obligations in support of the nation's objectives.

Achieving comprehsension and understanding is a complex of many factors. A first requirement is to establish a compelling reason why comprehension is necessary. Fortunately this has been provided gratis in the enemy threat. For the first time, we face a threat quantitatively superior and rapidly achieving qualitative parity in its weapon systems. It is a power deployed in depth in a land mass nearly thirty times as vast as all the real estate we fought over in World War II. It is a threat in which there is little virtue in pondering war plans based upon tactical symmetry for in so doing we play into the adversary's hands. It is a time when talk about "catching up" is not an acceptable approach because this implies second place. What is needed is the strategic superiority to cut in ahead and stay there. This is increasingly a function of the superiority of the American profession of arms.

So far, air strategy has been fostered by air doctrine. Very great strides have been made but great strides are relative at a time when the strides must be exactly right. Achieving this degree of correctness is by no means the sole province of a military school system. Nonetheless, it is pertinent that more than fifty percent of school graduates go to assignments where policies are made or are formulated. It is particularly pertinent that the field grade officer authors the staff study in most cases. If the staff study is to become the "work order" for progress, it is vital that the officer be as well equipped as possible to make it so.

He must therefore understand doctrine. However, most definitions of doctrine hold it to be the teaching of concepts and beliefs, and teachings, concepts and beliefs may all be fallable. To confirm them, we need facts and valid logic.

Reliance Of History

Here is where history can help us. It has not been too fashionable for airmen to rely on history. To some people, even the motto of the Air University, "We Proceed Unhindered by Tradition" is used as an argument to disregard the lessons of history, even though they may be helpful.

A study of history provides a reasonable agreement that military forces have always had three primary characteristics: mobility, firepower and vulnerability. This seems to be true of air power, although these characteristics need a little modification in light of the facts. Mobility and firepower are the positive factors but they become

dynamic ones only when they are combined into delivery capability. In this combination we have a basis for evaluation in a variety of ways, several of them significant.

Infantry, armor or naval vessels are in essence delivery systems as are aircraft. In comparison we find some unique characteristics in air power that are not inherent in other systems. All surface targets as well as airborne targets are accessible to systems exploiting three-dimensional space whether in or out of the atmosphere. Speed in acquiring these targets is an obvious essential in the light of the magnitude of the firepower now available.

Again, we are a nation that seeks to achieve its objectives through waging the peace. The ability to quickly deliver coal, medicine, or diplomats has unique advantages. Where capture and occupation were once the necessary military objectives of older strategy, they are a form of conquest no longer a part of our objectives if other strategy is available. Air power has the unique capability to achieve effects without the need to evade, capture or occupy.

Vulnerability has changed primarily in order of magnitude. The trenches and foxholes—even the Maginot Line of earlier wars do not offer their former security in light of the air or surface burst effects of nuclear weapons. Dispersal continues to have validity and the capability for three-dimensional dispersal has unique attractiveness.

This leads to a circumstance inherent in effective mobility but one that has been vastly magnified in its urgency. This has to do with knowledge of when to move—intelligence, or early warning. So far, we have not achieved the "Free Skies" capability suggested by the President. Despite a failure to achieve this end in atmospheric space, the Kremlin established it last fall with the flight of Sputnik.

When the time comes as it will when larger satellites, manned or unmanned produce intelligence, a significant and perhaps the most significant breakthrough for the free world will have occurred.

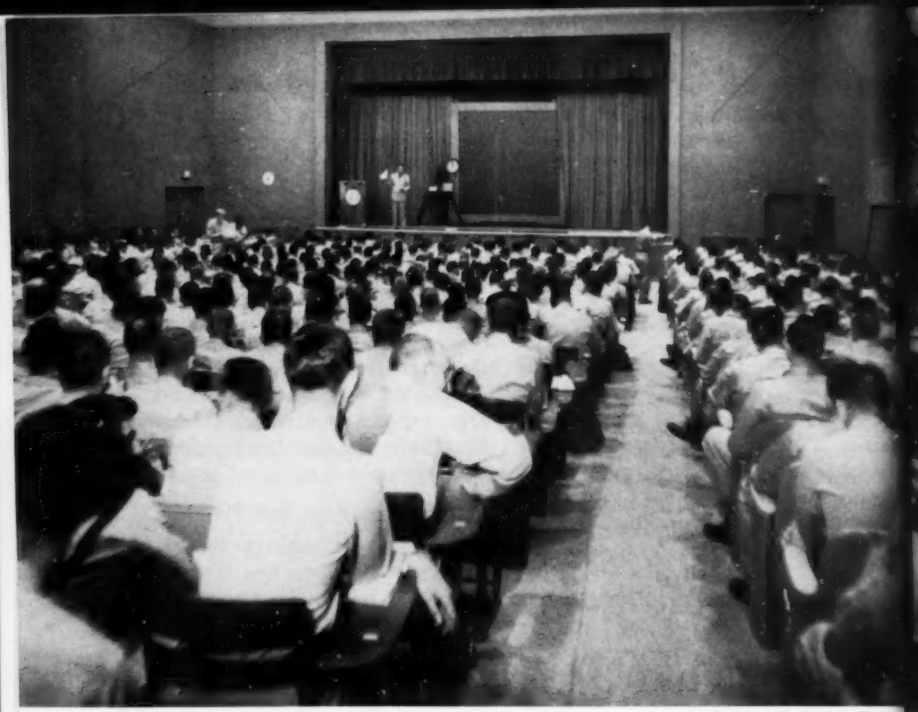
Today our policy is nonaggressive. Communist policy by the nature of the ideology is aggressive whether militarily, economically, psychologically or otherwise. It is generally conceded that the military initiative is at the option of the Kremlin. In the past, history suggests considerable advantage attaches to the side holding the initiative.

Implications, Past and Future

However, as military warfare systems have become more complex and very much faster, the time may be approaching when the "count down" time of preparation for attack is considerably longer than the time consumed in delivery. If vehicles of some description, exploiting "Free Space" can discern and reliably report the onset of the "count down" the chance for surprise will be lost. Without the twin assets of initiative and hope for surprise, there is at least room for conjecture as to whether initiative alone will carry its one time attractiveness.

There is one more major change in our circumstances which needs adding to our considerations. The time compression inherent in nuclear firepower and the unlimited characteristics of air —or space—delivery systems dictate for the first time a decisive force in peacetime. Under these conditions the principle of econmy of force achieves vital importance. This is obviously important dollar-wise. It is more important when we evaluate Communist resources in manpower in comparison with our own.

Here again air strategy is not just another and newer strategy, but some-



Credit: U. S. Air Force

Although extensively used, the process of assimilation of knowledge by lecture presentation to large groups, such as this one, is but one of many methods of learning. The large auditoriums of the Air University complex are air conditioned, acoustically engineered and designed for comfort as well as for practicality.

thing unique.

There are certain characteristics of land strategy which merit special mention. The two most important are that the largest force usually wins, and the casualties resulting are both heavy and relatively even on both sides.

Several examples illustrate this. In seven major battles of the Civil War, we find the Northern armies able to deploy a total of 650,000 troops, suffering 150,000 casualties against a total of 430,000 Southern force that took 130,000 casualties. The casualties of either side are several times the combat crew strength of the Air Force today.

Again, in World War I, the Allies mobilized approximately forty million against the Central Powers' twenty million. Casualties were twenty and fifteen million respectively.

Almost from its inception, air power indicated a change. In World War I, we saw Mitchell's Air Force of 1400 primitive aircraft set the stage for final victory over St. Mihiel.

Although the statistics for World War II are treacherous because of the contributing effect of early air superiority, examples are available. In Europe, we find Major General Handloser, Chief of O.K.W. Medical Services, testifying that air attack was the greatest casualty producer among German military formations, even though only some eleven percent of the sortie effort of allied air power was available for use against troops. Between Normandy and V-E Day, however, our own air casualties were some-

Credit: U. S. Air Force

A more important and more frequently used method of learning is the seminar or group discussion system. Seminars are used throughout the Air University system of education, with the sizes of groups varying with the schools, but always remaining small and intimate, as well as informal.

thing less than ten percent of our ground casualties.

Even in Korea, with certain limitations imposed, we find the same ratio continuing. After the break-out from the Pusan perimeter on the march to the Yalu the theater commander estimated 39,000 North Korean troops destroyed by air action. Records of the Far East Air Force, which provided the major sortie effort show only 241 casualties during the same period. Final estimates of 1,540,000 enemy casualties in the Korean War may or may not be correct. Even if air power was responsible for no more than twenty percent, which is a conservative figure, the rate of exchange was still better than 200 to 1 in our favor.

This is by no means an argument that air power, acting alone, is the solution to all problems. It is evidence, however, that requires careful consideration as we develop strategy.

In the foregoing, history has been helpful in providing three historically consistent characteristics of military forces and in suggesting two new and vital considerations—the need for early warning and for economy of force in our strategic planning. This is not doctrine as it is normally defined, since neither ideas nor concepts are involved but instead, facts.

As a matter of fact, none of this is taught in a classroom sense, since it is not an academic discipline but a recitation of factual data readily available. What is taught is the ability to find facts, evaluate them and add them

to a broader comprehension and understanding.

This same breadth of understanding is essential as a foundation on which to look ahead. Until we know more than we do about astronautics, it would appear that a working knowledge of facts and principles will be helpful and necessary, since they seem to be applicable. They will change from time to time but probably in degree rather than in substance.

I recall a visit to Segovia, Spain, where I had lunch in the Inn where Columbus lived while seeking support for his westward voyage. The state of maritime art in those days as well as the state of mariners' understanding had confined seafaring for the most part to the coastal waters of two-dimensional space. In a very similar way the state of the aeronautical art has confined us until recently to the atmospheric regions of three-dimensional space. Columbus taught us a great deal about our globe. Now we will likely learn a great deal about the globes around us. His was the basis for the founding of new nations—they are still being founded.

Qualified Imagination

This, then, is the second major element of the thinking process we have been trying to foster—qualified imagination. A few years ago, as much as two-thirds of a students' time was spent in listening to lectures. This was good. However, this also was largely a matter of "telling the troops" and didn't prove it was being retained nor did it require a return flow from the student. Above all it didn't give time or stimulation for a student to build and solo his own ideas.

This is changing. Today, in the Command and Staff School, for example, the student is "given" lectures only 50% of the time. Another 40% is spent in seminars applying what he has learned. A final 10% is spent in individual research pointed at live and future problems of the Air Force. All of his many writing and speaking assignments are calculated to encourage independent thought on real problems.

This by no means results in vast numbers of geniuses. It does result in a few good ideas. However, it does tend to foster an open mind willing to receive the good idea even if it is at the moment fresh out of ideas to give.

The third step in this thinking process is to service test the idea in order to learn whether it is good and to set the ground work in which it can grow towards usefulness. This is a tricky process. Most people dislike ridicule. On the other hand, the ridiculous must be identified and eliminated to make way for the sound.

I am not at all sure we will ever find the perfect solution to this process of evaluation. However, there are a few aids that help, all of them based on a certain amount of mutual respect and all based on removing the restraint to free expression involved in a linear listing of academic achievement. It is not true that a school assignment is a "free ride." Evaluation is a constant process, but it is designed to accomplish essentially three things: First and rarely necessary, is the obligation to act in the event of an officer who is not entitled to that status. Second, is the evaluation necessary to continually improve a curriculum and the effectiveness of its presentation. Last is evaluation of the student's strength and weaknesses in order that he may do something about it.

The final factor and perhaps in its way the most important of all is both the assumption and the requirement

of "first-class citizenship." This holds the obligation for integrity, ethics and readiness for unreserved fulfillment of the Oath of Office as a creed and not just some long-forgotten paper work.

Obviously, this is easier said than done. It isn't done in single lessons and exercises. It isn't done, either, during duty hours only. It is something that goes on all the time. Part of it comes from the example of school commandants, course directors and their faculty. Part of it comes from treating officers as such and expecting their compliance as a privilege and obligation of their status. A great deal of it comes from a group of contemporary and selected officers themselves under circumstances in which mutual evaluation is both required and a natural outcome. Again, some of it comes from a carefully planned curriculum, somewhat unique in military schools, in which the reasons and requirement for dedication are specifically examined.

Again, as in anything involving people, results differ in degree and differ in solution. A standard end-product of regimentation is not wanted. Neither is a namby-pamby, pretty word philosophy. The hope is for a closer approach towards competent professionals, aware of what might be needful and ready to do it.

The sum total is the effort to foster the keenest possible edge of qualitative superiority in the Air Force in the conviction that among free men this may be our real secret weapon.

A third basic method of learning is self-study or research. Facilities of the AU Library are as good as any in the southeastern United States. Closed circuit television is also being employed as a system of teaching, but to a limited degree at the present.

Credit: U. S. Air Force

Credit: U. S. Air Force

Senior officers of the Royal Air Force, U. S. Navy, U. S. Marine Corps, U. S. Army and

Credit: U. S. Air Force

THE STORY OF THE AIR WAR COLLEGE

By COLONEL RALPH L. MICHAELIS, USAF

To prepare senior Air Force officers for high command and staff duty may be the most succinct way of stating the overall general mission of the highest school of professional education in the Air Force—the Air War College. An approach toward the development of high command leadership embodied in the overall curriculum of the Air War College is a directed attempt toward the creation, development and fostering of new doctrines and sound concepts for the employment of air power.

Because of deterioration of the status quo, or because of rapid changes in policy at the national level—State Department or Defense Department—the philosophy and tenure of the course of instruction must necessarily be flexible, and is often in a state of flux. Colonel Ralph L. Michaelis of the Air War College relates how the challenge of mating the stated mission of the College to the requirements of everyday activities on a world-wide basis is met.

At the present time Colonel Michaelis is Deputy for Academic Instruction on the Air War College staff. After receiving a degree and doing postgraduate work at the University of Utah, he became a Flying Cadet in 1939. He received a regular commission in 1941, after which he served in the Southwest Pacific and China-Burma-India theaters during World War II. He served an interim period as Air Attaché to Australia, then returned to the Pentagon in 1949 in the office of the Directorate of Intelligence. He graduated from the Armed Forces Staff College in 1952 and was assigned to Headquarters, U. S. Forces, Austria, where he held positions on the staff and served as commander of a Special Activities Squadron. He graduated with the 1956 class of the Air War College and was retained on the faculty.

On 4 June 1947 at a ceremonial occasion marking the conclusion of the first academic year of the Air War College, Secretary of War, The Honorable Robert Patterson, with the Air Force Chief of Staff, General Carl Spaatz and the Air War College Commandant, Major General Orvil A. Anderson looking on, presented the first certificate of graduation to Colonel Wilbur W. Aring, USAF. On 6 June 1958 at a similar ceremony eleven years, six commandants and 1677 students later, the last diploma of the 1958 graduating class was presented to Colonel Joseph D. Zink, USAFR, by the Under Secretary of the Air Force, The Honorable Malcolm A. MacIntyre. These two actions, similar in nature and purpose, mark one of the first and

one of the latest milestones in the history of the Air War College. Many markers dot its path of progress. Some of these markers still stand, indicating the path to the future; others lie discarded by the way.

What is the Air War College? Why, when and how was it established? The story is interesting and reveals the farsightedness of its founders. It also discloses the educational acumen of those who have carried on their ideals ever refashioning procedures and curriculum to more fully meet the necessities of the day and the challenges of the future. It is a story of strong personalities, of strong purpose and an early recognition of the requirement for watchful national preparedness. The story of the Air War College is the story of a dynamic new service and the dedication of its leadership to the development of informed mastery and direction of the world's greatest instrument of peace—the United States Air Force.

As early as 1940 perceptive Army Air Corps leaders had begun to recognize the requirement for a specialized educational system to form a coherent air doctrine from an analysis of the many vague interpretations of Air Power. Earlier experiments in the field of officer education relative to the growth and utilization of aviation had resulted in the establishment of the famous Air Corps Tactical School of the 1930's. While serving to develop air tactics and strategy, later to be used in World War II, this early school was instrumental in developing steadfast adherents to a new and elemental air doctrine. Wartime experiences had tended to verify the soundness of these new concepts, but a place was needed to serve as a developmental seed-bed wherein all facets could be nurtured and developed into sound operational principles. For these reasons the Training Command of the AAF in early 1944 proposed, on the assumption that armed services would be recognized into three autonomous, coequal services, the establishment of three Air Force schools. These schools were to be positioned at progressively higher levels on the educational ladder. More detailed plans prepared by the Assistant Chief of the Air Force Staff for Operations in the latter half of 1944 proposed that the highest of these schools should be termed the "Air College" and should be equivalent to the Army's Command and General Staff School. Shortly thereafter this proposal was revised to provide for an integrated school system, incorporated into a single command organization to be called the Army Air Forces University—to include basic and advanced tactical schools, a command and staff school, a school of technology and an Air College. The War Department approved this plan and the AAF school later to be designated the Air University, was activated in November 1945.

The freshly established Air University issued the General Order directing the birth of the Air War College on March 8, 1946. One week later the same headquarters announced the appointment of Major General Orvil A. Anderson as the Commandant of the newborn institution. A mission was assigned and objectives established by an Air University Memorandum a few days later. The top floor of Austin Hall, Maxwell Army Air Base, the site of the old Air Corps Tactical School, was set aside for use as the new seat of learning.

The first class at the Air War College began on 4 September 1946. By the end of May that year the only personnel assigned to the new school were its Commandant, General Anderson, (who was still in Washington trying to complete projects incident to the

U. S. Strategic Bombing Survey) and Colonel Sydney D. (Rosy) Grubbs on liaison duty from the newly formed Air University. In mid-June Colonel Grubbs was assigned as Secretary of the Air War College and made several hurried trips to Washington to confer with General Anderson on the establishment of student training methods, physical arrangement of available space, procurement of additional staff and faculty and development of a curriculum. Exact arrangements could not be made since the size of the student body was not yet known. The fact that the staff was not completed at the time of matriculation was neatly handled by simply assigning two of the student designees as Assistant Commandant and Instructor to fill the vacancies. As the workload incident to the preparation and conduct of studies and the monitoring of seminars grew greater, additional students were designated to carry on as instructors—and at the end of the first class the whole school graduated, instructors and students alike.

The mission of the Air War College, as laid down in the founding documents reads: "To prepare selected officers for the employment of large Air Force units to insure the most effective development of the Army Air Forces as a whole and to consider the broad aspects of air power." A scope of instruction given General Anderson required the school to include:

a. Organization, characteristics, and strategical and tactical employment of Air Forces and larger air units.

b. Logistical support of air operations and the coordination of this support with other Army and Navy requirements.

c. Selection of target systems, targets and aiming points.

d. Coordination of air with ground and naval operations.

e. Responsibility of air commanders and staffs on the Air Force and higher level with respect to leadership, administration, intelligence, communications, public relations, personnel management, methods of instruction and civil affairs.

f. Strategic considerations concerning defense against air attack with particular emphasis upon possibilities inherent in new developments.

g. Effects of the application of atomic energy to air warfare.

h. General organization, characteristics and employment of Army Ground Forces, Army Service Forces and the Navy.

i. Seminar study of such Air Force problems and war plans as may be assigned by the Commanding General, Army Air Forces, or the Commanding General, Air University.

j. Critical examination of current equipment, techniques and accepted standards and trends in development, with the direction of thought toward improvement.

And perhaps most importantly the establishment directives delineated the objectives of the Air War College—objectives which, with slight revision, are equally as applicable today as they were in 1946. These objectives were:

To train officers for command and staff duty with higher air units, Headquarters, Army Air Forces and higher headquarters.

To stimulate study of new developments and their implications concerning future aerial warfare. (This involves both offensive and defensive measures and requires the development of a broad practical outlook.)

To give Army Air Force officers a comprehensive appreciation of the functions of Ground Forces, Service Forces and the Navy.

Colonel Joe Zink, '58 would have been hard put to recognize the Air War College of 1946-47. The faculty was divided into seven major divisions, i.e., Air Strategy, Air Tactics and Operations, Air Intelligence, Air Logistics, Research and Development, Command, Staff and Organization and the Management and Training Divisions. The curriculum was divided into fifteen different problem areas, ranging from oral self-expression through topics germane to the various organizational divisions, to a classified problem as the finale. Many special problems of interest to Headquarters USAF were accepted and studied by small groups of students.

The graduate of the class of '58 would have felt at home, however, with some of the procedures developed and utilized by the earliest Air War College course. The first Comandant, appreciative of the educational advantages involved, wisely adopted the seminar system of instruction and instituted the principle of academic freedom, two vital concepts which remain in effect today. Another sagacious action was to establish the policy of having all lectures presented by outstanding authorities in the subject under consideration. No university in the world could afford the caliber of instruction which this policy has made available. In addition the first Army Air Forces-Civilian Seminar was instituted during the first Air War College class. Perceptive planning was the heritage of the Air War College founders; progressive Air Force education their legacy.

The succeeding three years were periods of development and refinement of the procedures, administration and educational methodology established during the first hectic year and the following summer. Scholastic philosophies were modified and strengthened. Notable developments included the institution of a thesis program, reshaping of the curriculum into three academic phases labeled Academic, Evaluation and Projection, addition of a reading improvement course, and more effective utilization of guest lecturers.

An Extension Course Division was established during this period. An educational advisor (civilian) was acquired. By the class of 1950, the student body had increased to the figure of 137, with the admixture of Army and Navy remaining at 10% to 15% and foreign students steady at a total of 5 divided between the RAF and RCAF. Methodology, administration and facilities were improving. The flow of academic evolution was not always smooth, however.

Plans had been completed to reorganize the curriculum along new lines when the conflict erupted in Korea. A teletype message from Headquarters, USAF, dated July 20, 1950, suspended class operations of the Air War College indefinitely.

Follow-up orders from Headquarters USAF directed preparation of a plan for continuation of the College and alternately, the establishment of an extension course to take the place of the regular resident instruction. Comments were requested on the advisability of transferring the Evaluation Division of the Air University to the Air War College. A later letter supplied a training assumption that regular instruction might be reinstituted sometime after January 1951.

General Anderson's strongly worded response to these actions was a letter to the Commanding General of the Air University in which he cited the sad results of past experience in suspending professional education of the

Officer Corps. His reply attacked the shortage of qualified personnel as a valid reason for suspension of Air War College instruction (suspending educational activities because of a shortage of qualified personnel only insures that such shortage will continue to exist—ad infinitum); pointed out that simultaneously with this unilateral Air Force action the Army was opening a war college and that the Navy had not suspended any professional education for either junior or senior officers; and notwithstanding the belief of some officers that practical training and experience is the only method of achieving a high state of efficiency, proposed professional education as necessary to the proper growth of the Air Force and to national security.

The Pentagon's reaction was to reinstitute the Air War College. The directing documents stipulated: "The Air War College will conduct two courses per year of five and one-half months duration. "The first course, starting 8 January 1951, will cover essentially the same study areas as covered in the "ten months" course, but with less time for seminar discussions, bibliography study, etc. . . ." and laid down eligibility categories for attendance — "permanent majors or above serving in the grade of Lieutenant Colonels or Colonel with less than 18 years promotion list service as of the class starting date; Reserve officers under 43 years of age on active duty in the grade of colonel. . . ."

The number of students allotted to the Air War College was 134, the greatest number up to that time. The number of staff and faculty members likewise rose to an all-time high. Replanning to take care of the reduced curriculum proceeded at full speed. Nonessential elements of the long course were pared, time available for seminars was drastically reduced and a half-day per week was added on Saturday. The Evaluation Staff began functioning as an integral part of the Air War College, and a Chief of Staff was appointed to coordinate the overall activities of the school. It seemed as if the Air War College was again on its way as the Air Force's number one service school when another blow struck.

After having designed and forged the Air Force's senior school and nourished it during its formative years, defending its right to existence and devising its policies, General Anderson retired on 31 December 1950. Major General John DeF. Barker, Deputy Commanding General, Air University was assigned additional duty as Acting Commandant, Air War College.

One of the students has aptly summed up the experience of that first short course. "We were not the first class in the Air War College but we were certainly first in many notable ways. Ours was the first class to report to the War College twice, once in June 1950 and then after being sent home when the College was suspended as a result of Korea, again on January 9, 1951. We were the first class and as it turned out later—the only class to spend six months at Maxwell rather than the usual ten. We were the first class to go to the Air War College as a mobilization course and the first whose members reported on temporary duty with full expectation of returning to home commands after the course. And finally, we were the first class not to have family quarters on base."

"Yes, 1951 was a hectic year at the Air War College. We had Saturday classes and had to appear in Room One by 8:10 six days a week. The College was in the process of moving

Credit: U. S. AIR FORCE

Members of an AWC class exchange ideas and research information in one of the typical seminar classrooms located at Maxwell Air Force Base, Ala.

out of Austin Hall so that some seminars were held upstairs in Austin Hall, some were temporarily in the same building with Room One and some in the building next door. Many lived as bachelors in quarters that used to be available to War College families while the rest lived wherever they could in Montgomery."

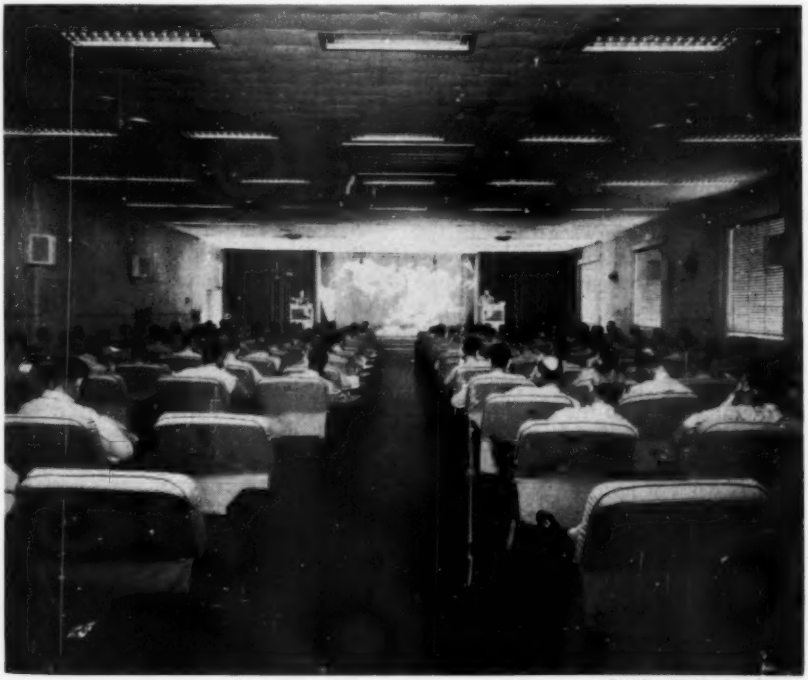
During the conduct of the first 1950 class senior members of the faculty, on an *ad hoc* basis, prepared a more sophisticated curriculum for the second class recommending several general changes in the concept and implementation of the curriculum. These recommendations were generally disapproved and planning moved toward a repetition of the first 1951 course. By 9 June commitments for speakers for the first third of the second course had been completed. On 10 June information was received that the Air War College would return to the ten months course—starting on 9 July.

Progress and growth have been the watchwords of the Air War College since 1952. Classes have been uninterrupted and have steadied at a figure of 165 select and experienced students. Representatives of nonmilitary agencies of the government have increased to include in addition to the Department of State, the Central Intelligence Agency, Federal Civil Defense Agency, U. S. Information Agency and National Security Agency. The academic and administrative functions of the College are housed in a complex of buildings modified for academic use. The Evaluation Staff with 20 to 25 senior officers assigned

occupies its own especially modified building adjacent to the academic and administrative group. The College boasts a well stocked branch library with personnel expressly trained to cater to the function of the school.

The present organization of the Air War College evolved slowly throughout the years. From an early staff of the Commandant and his assistant with many academic divisions directly subordinate, through various intermediate modifications the educational structure has evolved to the present organization. Serving as members of the Commandant's staff are the Vice Commandant, RAF, State, Navy, Army and Educational Advisors, and four Deputies representing Administration, Academic Instruction, Extension Course and Evaluation.

Although in retrospect the evolution of the Air War College has been progressive in nature, not all of the dreams of the Air War College fathers have been fully realized. One such dream was the Graduate Study Group of the Air War College. This research body, conceived in the mind of the first Commandant, recommended by the Air University Board of Visitors, blessed and authorized by the Air Force Council and the Vice Chief of Staff and ordered by the Commander, Air University, came into being under the direct supervision of the Commandant of the Air War College, Major General Roscoe C. Wilson in July 1952.



Credit: U. S. Air Force

One of the outstanding features of the AWC curriculum is the almost daily presentation-lecture-discussion period led by an outstanding personality in the field of science, industry or the military.

The assigned mission of this group was essentially three-fold. It was to serve as: (1) a "finishing school" for selected officers; (2) a research production organization in the area of long-term Air Force responsibilities and objectives; and (3) a generator, over a period of time, of a philosophy of air power. Although a maximum of 20 members was authorized for this Air Force experiment in higher learning, it was never more than twenty-five percent manned. Its initial efforts produced several theses of acknowledged importance to the Air Council. Gradually its functions were merged with those of the Evaluation Staff where today it can be identified as the Long Range Planning Group of that Staff.

A word should be said about the Air War College Studies Group. This group, activated on 24 May 1954, was created for the express purpose of editing and publishing a series of articles to be known as Air War College Studies. The materials were to be the by-products of theses, lecturer's manuscripts, and other writings of the Air War College staff, faculty, guest lecturers and students. After three years of operation, during which a number of monographs were selected, edited and printed—and received with enthusiastic acclaim, this activity was discontinued due to the lack of publication money. Despite efforts to re-establish the AWC Studies, budgetary support has not been forthcoming and a number of papers, which would be of considerable interest and value to the Air Force remain in manuscript form.

The Air War College was conceived in an atmosphere which recognized that Air Force officers had far too little time for reflection, time to ponder the unfurling magnitude of the air weapon, time to engage in true strategic thinking. Its makers viewed the college as an institution for intellectual speculation and development of dynamic concern for the many varying factors which affect the national security of the United States. Basic objectives were to challenge the members to think; to relate one set of facts to another; to probe the soundness of doctrine. Students were to be encouraged to objectively scrutinize the tenets of warfare as they might be practiced in the future. In order to achieve these objectives positive policies were fashioned and special care taken to create an appropriate environment.

Important to achieving this environment is the quality of the students. Each is carefully selected according to the excellence of his past performances and potential for future growth. Rigid criteria have been developed to exclude those whose future usefulness to the Air Force is limited. In order that the most highly select individuals might be singled out to attend the Air Forces' senior educational institution, regulations governing student designation call for individual scrutiny by a Board of General Officers.

Every practical provision has been made to create within the physical facilities available an atmosphere suitable to the objectives of the school. During the school year an efficient administrative section reviews and corrects each student's records and files. It also prepares the student-elect for his tour at the College by furnishing him preliminary data concerning the course of instruction and facilities at Maxwell Air Force Base. Any responsibility which can be lifted from the shoulders of the student is done so willingly and cheerfully by the school. Flying schedules are programmed to fit academic activities. Medical care is available; the Air War College student soon becomes friendly with the

school's own Flight Surgeons and a "family doctor" atmosphere soon prevails.

The Air War College established as it is in the older section of Maxwell Air Force Base, often goes unnoticed by the casual visitor to the Base. Even its interior, with the exception of the lecture room where certain latitude has been allowed in the interest of comfort, is austere in appearance and functional in design. Furnishings are tasteful but plain as they must be to conserve space and contribute to the efficiency of staff and faculty.

Perhaps one of the most basically meaningful expressions frequently reiterated at the Air War College is "that the art of war can be learned, but cannot be taught." In keeping with this principle the College presents the student with a vast amount of pertinent and authoritative information as well as opinions and views of subjects related to or involved in the conduct of modern warfare. It does not however attempt to shape his thinking and only such guidance as necessary to prevent undue loss of time is provided. No dogma or fixed rules for the development of strategy or the conduct of war are advocated. Although Service viewpoints and "party lines" are examined, they are offered as but one of many necessary parts where logical thinking can be projected, against which facts can be carefully weighed and upon which sound decisions can be reached by exercise of educated judgment. Policies, systems and organizations are critically analyzed—not so much from the viewpoint of a censor or as an act of judgment, but to discourage complacency and to stimulate judicious and constructive thinking on these subjects. In the words of the present Commandant, Major General Robert F. Tate, "First let us understand completely why things are the way they are and the basis of their evolution to present standards—then, and only then can we deal realistically with current problems of national security and project our thoughts meaningfully and usefully to the problem of the future."

Translation of the simple and unmistakable meaning of the Air War College objectives into ten months of study is not a simple matter. It involves much which is open to varied interpretation—military, national and international issues that are not only critical but of an ever-changing nature. Although there are many abstract factors which apply to military leadership and to warfare, wherever and however it is fought, these factors alone are of little or questionable value to a commander or staff officer unless the fundamentals of the art are weighed in relation to the situation facing him. In the knowledge that the situations of today are not those of last year nor the year before, nor those likely to apply in the future, the curriculum of the Air War College is maintained in a dynamic state. At the same time the College is steady in its search for essential truths and understanding of appropriate strategies for employment of air forces in situations of global, limited or cold wars, now or in the future.

Basically the curriculum of the Air War College is a study of U.S. strategy. All essential factors which enter into the creation of a strategy are taken into consideration. It is the belief of the faculty that understanding of the nature and interrelationships of the various elements of a nation's power is fundamental to the comprehension of strategy. Secondary military subjects such as operations, intelligence, communications or logistics are not compartmentalized; rather, significant

issues dealing with these subjects and their intricate relationships are expressed systematically throughout the curriculum. In the knowledge of these relationships the student can gain a comprehension of the main issues and forces involved, and of the direction or areas in which possible solutions lie. Such understanding gives an appreciation of the problems and methods of problem solving.

The Air War College curriculum is divided into three Phases each of which is directed toward attainment of certain interrelated learning objectives. Each Phase is further subdivided into Studies to allow detailed analysis of individual considerations.

The first Phase is devoted to a consideration of the many factors influencing international relations, with emphasis on various elements of power employed by select nations to achieve their political objectives—a study of power politics in the past and of force as an instrument of national strategy. This Phase also brings the student up to date on the current world conflict with all the ramifications of east versus west, in terms of government, technology, religion, size, growth, psychology, wealth, ambitions, and military strength. The study of world history and current affairs forms a solid understanding upon which later studies of strategy can be built.

The second Phase covers current military strategies in situations of total, local or cold war. The first study of the Phase is concerned with the many and varied factors which influence the current military strategy of the United States—firepower, mobility, national security policies, the decision making processes at the highest governmental level, doctrines, roles, missions and tasks of the various military departments, Defense Department organization, development of new weapons and weapon systems, national economy, Congress, public opinion, foreign military aid, scientific development and coalition strategy. A review of all these elements is essential to an understanding of the capabilities of the National military instrument and its planned use.

The second study deals with strategy proper — Service interpretations of U. S. defense policies and requirements to deal with all shades of war. An understanding of the capabilities and planned employment of forces (particularly Air Forces) in the implementation of our strategy in war is basic to this part of the course. The principle question considered is the capability of the United States to wage war. This question is raised within the context of conflicting philosophies of operations and the conflicting priorities for the development of weapons associated therewith. For instance, a critical analysis is made of the theory that the ability and the willingness of a nation to use its forces in total war, if necessary, determines its ultimate power position in international conflict. Whether lesser tests of power must, and will be conducted under the sanction of the capacities for force in total war is examined in light of specialized force requirements for optimum limited war capability.

The entire second Phase deals with the present, and the term "current" is emphasized. The reason for this restriction becomes obvious when considering the generally accepted supposition that the next war will be fought with the forces in being and the weapons in hand. "Druthers" and plans for the future are explored in subsequent studies.

Wars of the future and the strategy which must be evolved to fight them is the central theme of the last third

of the curriculum year, Phase III. Of special interest at this point in the course is a clear understanding of the continuing revolution in military weapons and their means of delivery—by both protagonists. This revolution is gaining momentum as the world proceeds with the development of space activities, ballistic missiles and other advanced weapon systems. These fundamental changes and the urgency with which military dicta must be recast to keep apace of technology and applied science are recognized and faced squarely.

During this Phase the student is confronted with all the difficulties of an uncertain future. Authoritative lecturers help him consolidate his own thoughts. The Chiefs of Staff of the various services make their appearance during this period. Outstanding leaders and thinkers in the field of international relations, business, science and imaginative individuals from other walks of life present the results of their prognostications of things to come.

To complement student efforts during this portion of the curriculum the class is augmented by a representative group of distinguished civilians from various sections of American life. This group, collectively labelled the National Security Forum, remains with the resident students for one week and partakes of an especially tailored segment of the regular curriculum. The group attends lectures, seminars and discussion periods, contributes to the strategic thinking for the future of its individual members and the Air War College student.

How does the Air War College cause all of the foregoing to come about? In what manner does the student accomplish the desired learning outcomes described in the preceding paragraphs? Basically there are four major learning activities by which the Air War College members are induced to learn—lectures, reading, seminars and writing.

Lectures, of course, need little description. They provide essential views which, for the most part, are authoritative in nature and not readily obtainable in any other form. Normally the student spends from two to three hours each morning listening to and interrogating some carefully selected lecturer who is the best obtainable in his field of endeavor.

Students are assigned various books and selected articles to read on a rather continuous basis throughout the entire War College course. These readings are carefully selected and are a highly important augmentation of student understanding.

In seminar the student discusses the views and thoughts expressed both by the lecturer and by the assigned readings against a backdrop of his own professional experience. Sometimes in concert with his fellow seminar members he prepares written reports of a military nature accommodating or rejecting the many and varied views which the sum total of his learning experiences have provided. On occasion he may be required to present his conclusions orally to his seminar group, to the Commandant or to the entire Air War College and invited guests from other Air University activities.

Although the Air War College curriculum is variously described as being built around the seminar system or as a lecture course, the interrelationships and mutual dependence of each of these tools of learning are emphasized to the student. Interlaced throughout the entire spectrum of learning activities is the pervading principle of academic freedom. No thoughts are

excluded, no views suppressed. It is only in this atmosphere of open and frank exchange of ideas, interpretations and opinion that true intellectual advancement can take place. Students, faculty and guest lecturers alike understand that the views which they express are held in the strictest confidence by all—that the sanctity of expression is extremely important and zealously guarded.

Annually a Board of Visitors appointed by the Chief of Staff, USAF, visit the Air War College and other schools in the Air University system. Generally speaking this group is made up of nationally prominent educators whose purpose at the College is to examine organization, facilities, curriculum, method of instruction and all other pertinent aspects. Members of the Board are keenly aware of the increasing complexity of weapons and strategy and the need for education which is the basic ingredient of military progress. These distinguished individuals assist in improving the curriculum and from time to time have furnished confirmation of the soundness of the policies and procedures which have been adapted by the Air War College in its endeavors toward mission attainment.

Having been subjected to this educational experience, what happens to the graduate of the Air War College? Does he have any greater usefulness to the Air Force as a result of his year of reflection and activity in the realm of education? Periodically the alumni of the Air War College are canvassed to determine, through the clear hindsight of intervening years, an opinion of the efficacy of their course of instruction in preparing them to meet more effectively and with greater understanding the situations which have confronted them since graduation. The results are highly gratifying. Of the 1300-odd Air Force graduates at the time of this writing, 144 have reached General Officer rank, 50 of whom are Major Generals.

One of the direct benefits to the Air Force which is often neglected in assessing the value of the Air War College is that of having its senior officers associating with and knowing a large number of their peers. Not only is there an immediate personal benefit gained by the sharing of past experiences while at Maxwell but a matrix is provided for the development of common understandings promoting later cohesion and purpose in the higher levels of command.

A narrative of this sort can never be replete without mention of the various individuals whose guiding hands have shaped the institution to its present effectiveness. Major General Orvil A. Anderson, about whom much has already been written in the earlier parts of this article relinquished command of the Air War College to Major General John DeF. Barker on 5 September 1950. General Barker assumed the position as Commandant in addition to his other duties as Deputy Commander of the Air University and functioned in this capacity until relieved by Major General J. A. Samford on 1 August 1951. General Samford's tour with the College was terminated after only two and a-half months by assignment to Headquarters USAF. He was replaced by Major General R. C. Wilson on 18 October 1951 who served as Commandant until 28 April 1954. Colonel R. J. Goewey, who had been functioning as the Director of the Evaluation Staff, was pressed into service as Commandant when both General Wilson and the Vice Commandant, Colonel Guyer were transferred. Colonel Goewey served in this capacity for three months before being replaced by Major

General D. T. Spivey on 26 July 1954. General Spivey remained as Commandant until his retirement on the 15th of June 1956. Following his departure the Vice Commandant, Brigadier General S. F. Giffin acted as Commandant until relieved by Major General R. F. Tate, the present Commandant on 3 September 1956.

The Air War College has now taken its rightful place among the highest military educational institutions; its value to the Air Force and to the security posture of the United States has been recognized. To maintain this position however, it must remain dynamic in nature. Although its purposes will be relatively constant many variants will effect the manner in which its objectives will be achieved.

In the matter of available students, certain changes to the selection criteria used in the past must inevitably be made. Promotion policies which work toward a time when every officer in the United States Air Force will be serving in his regular permanent grade are already beginning to take effect and will certainly have a decided influence on the make-up of future Air War College student bodies. While the Air Force officers in the class of 1959 are all Colonels (with one exception) the class of 1960 will most certainly contain a generous sprinkling of Lieutenant Colonels. Later classes may be exclusively confined to this student body grade.

Another and immediate consideration is required in determining the size of the school under these new conditions. With a total number of somewhat over 4000 Colonels in the Air Force the Air War College has been accepting about 130-135 per class or about 3.5%. The physical facilities of the school will not permit appreciable expansion. The same percentage of the Lieutenant Colonel grades would call for yearly intakes of about 350 Air Force students augmented by the usual Army, Navy, Marine, RAF and RCAF students, (whose quota it might also be desirable to raise). The impact of this reasoning is of course both apparent and real—a new facility would be required.

Plans for a new Air War College have been drafted and considerations as to size, location, design and cost have been made. Present thinking seems to favor its location at Maxwell along with the other new educational facilities of the Air University. Its size should be adequate to accommodate a student body of 350. In design it should fit into the established decor of the new Air University complex.

What of the future of the Air War College? In this fast changing world what should the Air War College student know to better prepare him as commander or staff officer of the future? To what extent must the curriculum be tailored to fit the evolution toward integration of the Armed Forces, combination of missions and tasks and singleness of national military purpose? These questions and many more of equally solemn importance must be faced squarely by the Air Force in years to come. The Air War College must give form and foundation to these considerations if the hopes and prayers of its founders are to be realized. The words of General Fairchild are just as appropriate today as they were at the opening exercises of the first Air War College class . . . "should the Air University succeed in educating and producing such planners and future leaders that they may design an Air Force so adequate that it need never be used, we shall have completely fulfilled our mission."

AFROTC
(AIR FORCE RESERVE OFFICERS' TRAINING CORPS)

By MAJOR GENERAL T. C. ROGERS

The present Commandant of the Air Force ROTC, Major General T. C. Rogers, once made the statement that "Tomorrow's Air Force leaders are today's students in Air Force ROTC, which is now recognized as the principle source of United States Air Force officers. The qualities required of an Air Force leader are essentially the same as those required of any good citizen of this country; and the training received in this program prepares the student to more effectively take his place in society wherever he may be needed." This highly pertinent remark becomes even more motivating when analyzed in terms of past, present and future considerations. The present comparatively large and stable ROTC program developed from a meager and shaky beginning, when the primary purpose of the ROTC program on the college campuses of the country was simply to furnish a pool of officers for the Reserve, who would have a basic understanding of the military requirements of the country.

To that end, the early ROTC programs served their purpose. But with World War II and the Korean War, the requirements changed drastically. In its embryonic stages the Air Force and its predecessor units gathered its share of officers and leaders through the generosity of the ground forces of the Army. The first few dedicated airmen found the sledding indeed rough when trying to compete for status. As the stature of air power grew, however, so did the necessity for more officers and leaders, in terms of quantity and quality. Eventually, the Air Force was able to draw, on a percentage basis, from the number of graduates of the U. S. Military Academy and from the U. S. Naval Academy. The number of officers obtained in this manner in no way satisfied the crying need for more. This necessity was one of the elements which led to the great expansion of the ROTC program in the middle and late forties. Even with the full establishment of the Air Force Academy the number of Air Force officers required in the present conflict, and in the light of the advancements in science and technology, has to be obtained from other sources, principally the AFROTC program.

With today's highly technical Air Force, its supersonic aircraft, electronics, radar, atomic and hydrogen weapons and missiles, it is necessary that the Air Force have the finest educated young men to handle this equipment, to make major decisions that may affect everyone's life, and some day to become the Air Force commanders and leaders.

General Rogers has had charge of the AFROTC program since 1 October 1956. He was commissioned a 2nd Lieutenant in the Infantry on June 12, 1936, and entered pursuit-type aviation immediately thereafter. Since then he has served a large portion of his military career in pursuit and fighter-type aviation. General Rogers served as Chief of the Personnel Section in the Directorate of Air Defense at AAF headquarters, and Chief of the Fighter and Reconnaissance Section. Later he was made Captain of the Fighter Evaluation Team, Air Evaluation Board, in the Southwest Pacific. In May 1946 he returned to Headquarters as Staff Planning Officer in the War Plans Division. He graduated from the Air War College in 1950, and went to Korea as Assistant Deputy for Operations of the Fifth Air Force. In February 1951, he assumed command of the 18th Fighter-Bomber Wing and flew 50 combat missions in the F-51 Mustangs. One year later he became Deputy Commander of CCT at Randolph Air Force Base, and on August 13, 1953, became commander of Luke Air Force Base, Arizona, until his transfer to Maxwell Air Force Base.

The ROTC was born of fear and distrust and nurtured on the fundamental belief that a large centrally-controlled standing army was a threat to civil liberties.

Immunity to conscription was one of the big attractions that brought thousands of Europeans to our country during the 19th Century. The American Revolution had demonstrated that a citizen army could successfully defend and protect our political independence and territorial integrity. Early Americans feared and distrusted the professional soldier who was "detached by feeling and by interest from the great mass of the people."

But, early in our history, the fallacy of dependence upon an untrained citizen army became apparent. The defects in the militia system were evidenced in the War of 1812 when our unorganized and undisciplined troups abandoned Washington to the British regulars.

Shortly after that war, Captain Alden Partridge (a former Superintendent of the United States Military Academy) proposed the establishment of seminaries of learning where young men who would some day be the leaders of society and officers of the militia, would be trained in military science and tactics. This solution, he felt, would provide the citizen army with trained and disciplined officers and still obviate the necessity for a large standing professional army.

In 1819, he put his proposal into action by establishing the first non-professional military school in America at Norwich, Vermont. With this act, he became the father of ROTC. However, it took another war to develop and implement the ROTC concept.

The shortage of competent military leaders was particularly evident in the Union Army during the early months of the Civil War. In 1862, Representative Justin Smith Morrill from Vermont introduced and successfully defended a bill entitled, "Land-Grant College Bill," better known today as the Morrill Act.

This Act provided that federal lands be transferred to the various States to endow: ". . . at least one college where the leading subject shall be, without excluding other scientific and classical studies, to teach such branches of learning, and including military tactics, as are related to agriculture and the mechanical arts. . . ." Fear of the alternative—a large standing army commanded by professional soldiers—was a major factor in obtaining support for this bill.

In implementation, the bill was interpreted by the States as *requiring* at least two years of basic military training with the last two years of ad-

vanced study leading to a commission being voluntary.

Almost 100 years and four wars later, we find that the industrial revolution and the recent accelerated advance in the field of technology have so revolutionized warfare that the militia concept is without question outmoded. The militia is now delegated a supporting role. The complexity of modern war machines and the universal nature of war necessitates a large highly trained and relatively stable combat force.

Fortunately, the same factors that led to the evolution of warfare have also served to vitiate the threat to our civil liberties of the large standing army and the professional soldier. Our military installations are for the most part located in industrial areas. Members of the Armed Forces are an integral part of the community in which they live.

With these changes, the need for the Reserve Officers' Training Corps—as originally conceived—no longer exists. Then why maintain it?

The factors which have outmoded the militia concept have also operated to raise the qualitative requirements for officer status. More than ever, the college campuses of America are the reservoir of high-quality manpower from which are drawn the coming leaders of business, industry, and the professions. The national security demands that the military profession be enabled to draw its fair share from this reservoir. But the day has not yet arrived when college men regard the military profession as a way of life in the same sense that they look upon law or medicine or engineering. Very few men have any discernible interest in a military career when they enter college, and the experiences they undergo in the academic classroom, the laboratory, the athletic field, or the dormitory are not designed to awaken and reinforce that interest. The question then becomes: What is the best method to tap this reservoir?

ROTC has many advantages, not the least of which is 100 years of tradition on college campuses. On many campuses, ROTC has become the focal point of all student activity. Particularly in the large compulsory State colleges, it is the only activity that unites the student body and in essence generates the college spirit. To many college presidents, ROTC is important from the standpoint that it provides a lesson in democracy. Within ROTC, all male students regardless of race, money, or social background are brought together as equals, wearing identical uniforms, where they are taught to function as a unit and progress on individual merit.

ROTC as a source of career officers also provides a further tranquilizing agent against the ingrained fear of the professional soldier. A look at the history of militaristic governments reveals that the officer corps was recruited from a very small and select segment of society. In our own early history, it became fashionable for the sons of wealthy Southern planters to attend West Point, Virginia Military Institute, or The Citadel. This fact accounted for the early success of the Confederate Army.

Through ROTC, we select our officers from every community in the country and every walk of life. They receive their indoctrination, training, and education under the watchful eyes of respected local citizens. They develop close ties with home, school, and community. Even a large standing army led by such officers is not likely to pose a threat to civil liberties in the eyes of family and friends.

On the other hand, the academy graduate, even though drawn from the

same basic source, is taken at a more tender and impressionable age and is in effect cloistered from the public. He comes out of school a professional soldier whereas the conversion of the ROTC graduate to professional status is a gradual process.

Primarily, ROTC taken in conjunction with his other academic studies provides the best and most economical procedure for motivating, training, selecting, and educating young American manhood for a career in the Armed Forces. All of these tasks must be accomplished by any successful procurement agency. Motivation must occur before selectivity can be exercised.

In time of war, spontaneous patriotism provides the motivation. But, during the periods between wars, we must sell the Air Force as a career much as does the industrial recruiting officer. In this, we have a big advantage in that our emissaries are on the campus during the entire four years of the student's education. On the campus, the selling job is done quite differently than the normal recruiting campaign waged by all Services to fill the enlisted ranks. The task of motivation is accomplished by example and precept and the stimulation of intellectual curiosity. Admittedly, all the tools of the trade are employed, but it is still a slow sell.

While serving its primary mission of procuring highly qualified officers for the Air Force, the Air Force ROTC also produces a by-product that is extremely valuable to the security and well-being of our nation—military indoctrination, training, and an education in the fundamentals of air power are given to thousands of young men who will not attain commissions through the ROTC. These young men will go into positions of leadership within the civilian community with a better understanding of their obligations as citizens. They will be better prepared to assume positions of responsibility within the civil defense organization, and they will have a sympathetic understanding of the role of air power in the development and defense of our country.

What is the ROTC? Perhaps it can best be defined as an officer-procurement program with highly-important educational aspects, which is conducted in partnership by the Air Force and the cooperating universities and colleges. It embodies a course of military instruction which, complementing the academic education of the student, fits him to be a leader in civil or military life. In this, it approaches Milton's definition of a complete and generous education—"that which fits a man to perform justly, skillfully, and magnanimously all the offices, both private and public, of peace and war."

The AFROTC course embodies a basic course and an advanced course, each of two years' duration. The advanced course includes a summer-training period of four to six weeks' duration, conducted at selected Air Force bases. The remainder of the course is conducted on the campuses, except for the Flight Instruction Program (for seniors) which takes place at a nearby commercial air field. The entire course (exclusive of the Flight Instruction Program) involves a total of 640 hours of classroom and leadership laboratory work.

The threefold objective of the Air Force ROTC may be succinctly described as "Motivation, Selection, Education." Although these are of equal importance, motivation presents the most difficult problem, as is discussed elsewhere.

Origin and Growth

Historically, the Air Force ROTC

traces its origin to the Army ROTC program, through the seven Army Air Corps ROTC units which were maintained during the 1920's.

Late in World War II, the decision was made by AAF Headquarters to re-enter the ROTC field on a large scale after the end of hostilities. This decision was brought about in large part by the outstanding contribution made by the Army ROTC toward the war effort, as recognized by General Marshall and others.

In the fall of 1946, Air ROTC units were inaugurated on 78 campuses as a part of the Army ROTC establishments already maintained there. Early in 1948 the newly-created Headquarters United States Air Force assumed control of the program at the command level, and in July 1949 the final separation of Army and Air Force ROTC activities at the campus level was accomplished. By this time the number of Air Force units had grown to 125, of which 95 were at institutions shared with the Army.

The Korean emergency brought about a major expansion to a total of 188 units. Since 1956, nine units have been discontinued at the request of the host institutions and two more are in process of "phasing out," bringing the total to 177. Although the 177 institutions having Air Force ROTC units represent only about one-seventh of the total number of degree-granting colleges in the United States,

Credit: U. S. Air Force

The aspirant flegling receives his first real indoctrination into the military as he receives his clothing and uniforms from the supply sergent at the ROTC unit on the campus.

they produce each year about 70% of the national total of male graduates receiving baccalaureate degrees. This is perhaps the best illustration of the wide coverage provided by the Air Force ROTC.

Officer-procurement goals assigned to the program have fluctuated widely over the years. Since 1953, procurement objectives have been limited by troop spaces in the active establishment.

Field Responsibility

Initially, field responsibility for the program was assigned to the Air Training Comamnd. Early in 1947 this was transferred to Air Defense Command (later Continental Air Command), primarily because the administration and supervision of the widely-scattered units would be facilitated by using the command facilities of the subordinate continental Air Forces.

Late in 1951, the decision was reached by Headquarters USAF to transfer field responsibility for the Air Force ROTC to the Air University. This was done because of the importance of the educational aspects of the Air Force ROTC, and the feeling that the Air University should have the responsibility for undergraduate as well as graduate officer military education. In August, 1952, Brigadier General (later Major General) Matthew K. Deichelmann become the first Commandant, AFROTC. The writer succeeded him in October, 1956.

Air Force ROTC Curriculum

In order to attract and hold the best-quality students, an ROTC curriculum must be interesting and intellectually challenging. To overcome the disadvantage under which the military profession labors in comparison with others as a prospective way of life, the curriculum must have built-in motivational factors; yet it must avoid becoming an out-and-out indoctrination or recruiting program if it is to be acceptable to the community of scholars. It must blend theory and practice. Last but foremost, it must develop the leadership potential inherent in college men.

Until 1951, the Air Force ROTC curriculum was based on the concept that very few AFROTC graduates would be called to active duty short of a major emergency. For this reason the program of instruction attempted to accomplish two objectives: a general objective, involving leadership development and pre-commission military education and orientation required by every prospective officer; and a specific objective, to provide him with enough career-field specialization to enable him to be usefully employed in a specific job without further formal schooling in the event of mobilization.

As experience was gained with this program, it became apparent that neither objective was being accomplished in a fully satisfactory manner. Moreover, with the advent of the Korean emergency and the decision to call all AFROTC graduates to active duty, it became apparent that the career-field specialization could be provided more effectively after the graduates were on active duty. Late in 1951, the decision was made to concentrate on leadership development and general pre-commission military education.

The task of building the new curriculum was assigned to the Air University, under guide-lines prescribed by Headquarters United States Air Force. Under the leadership of Brigadier General Matthew K. Deichelmann, the Air Force ROTC Commandant - designate, a Curriculum

Development Group was formed, including both military and civilian educators.*

The curriculum developed by this committee was reviewed in the spring of 1952 by the Air University Board of Visitors, by a special committee of university deans, and by a committee from the Air Force Comands who would use the graduates. The recommendations of all three reviewing groups were taken into consideration and were reflected in the curriculum as finally approved by Headquarters United States Air Force. This curriculum has been in use throughout the program from 1953 until the present. Continuous evaluation and experience show that the basic elements of this curriculum are sound. Some minor rearrangements and reorganization are being effected during the next few years. The curriculum that is being taught in the fall of 1958 is essentially as follows:

Air Science 1, (Freshman year), Foundations of Air Power-1. A general survey of air power designed to provide the student with an understanding of the elements of air power and basic aeronautical science. This course includes Potentials of Air Power, Air Vehicles and Principles of Flight, Military Instruments of National Security, and Professional Opportunities in the United States Air Force.

Air Science 2, (Sophomore year), Foundations of Air Power-2. A more advanced consideration of Air Power as exemplified by the combat operational capabilities of the United States Air Force. This course includes: The Evolution of Aerial Warfare; the Weapon System Development; United States Air Force Operations in both peacetime and waretime and the future of Air Power.

Air Science 3, (Junior year), Leadership Principles and Practices. Introduces Air Force ROTC Cadets to principles of leadership as they apply to Air Force problems and tasks. This course includes: the nature of communication; the nature and use of information; the social and psychological determinants of Air Force leadership; and Air Force staff action and procedures.

Air Science 4, (Senior year), Global Relations. A study of global relationships of special concern to the Air Force officer, with special attention to such aspects as weather, navigation, geography, and international relations. This course also prepares the cadet for the transition from civilian to military status as a junior officer.

At the present time the AFROTC Headquarters is conducting a comprehensive long-range evaluation program to measure the development of cadets in the areas of knowledge, understanding, attitude, and skills, as well as the effectiveness of the graduates in their officer assignments. This is one of the most comprehensive evaluation programs in higher education in the United States today, and the results of the many studies in connection with this project should give firm guidance to the Air Force in regard to curriculum changes of the future. This project should also provide the most significant information about officer-development thus far attained and should have a marked effect on future officer procurement programs of the Air Force.

Field Supervision of the Program

The 177 Air Force ROTC units are located in 46 states, the District of Columbia, Hawaii, and Puerto Rico.

* The acknowledgment pages of our textbooks read like a Who's Who in American Education.

Obviously it is impossible for the Commandant to visit each unit every year, let alone to give adequate personal supervision. Yet experience indicates that an additional command echelon between the Commandant and the Professors of Air Science is inherently undesirable.

Field supervision is accomplished by ten Assistant Commandants, all former Professors of Air Science, who respectively visit each of the approximately 18 units in their geographical areas at least twice annually. Each unit is also formally inspected at some time during the academic year by one of five separate inspection teams, whose members have all served at AFROTC units.

Instructor Competence

Instructor competence has been of major concern to Air Force since the Air Force ROTC program was established.

Since the very beginning of the program, Air Force ROTC personnel have been given special teacher training before starting Air Force ROTC duty on a college campus. The Air Force ROTC Orientation Courses held at Perrin Air Force Base, Texas, in the fall of 1946 placed large emphasis on teacher improvement. Each student was given the opportunity to do practice teaching in this controlled situation and received help on teaching procedures.

In 1947 the Air University was asked to train the new Air Force ROTC instructors. This was provided at Craig Air Force Base by members of the Educational Advisory Staff. In 1948, the Air University did not have the capability of providing this instruction, but contracted with the University of Alabama to do this for them. Since 1949 most of the summer classes of the Academic Instructor Course have been reserved for training new Air Force ROTC instructors. This training has contributed substantially to the effectiveness of the officer instructors assigned to the program.

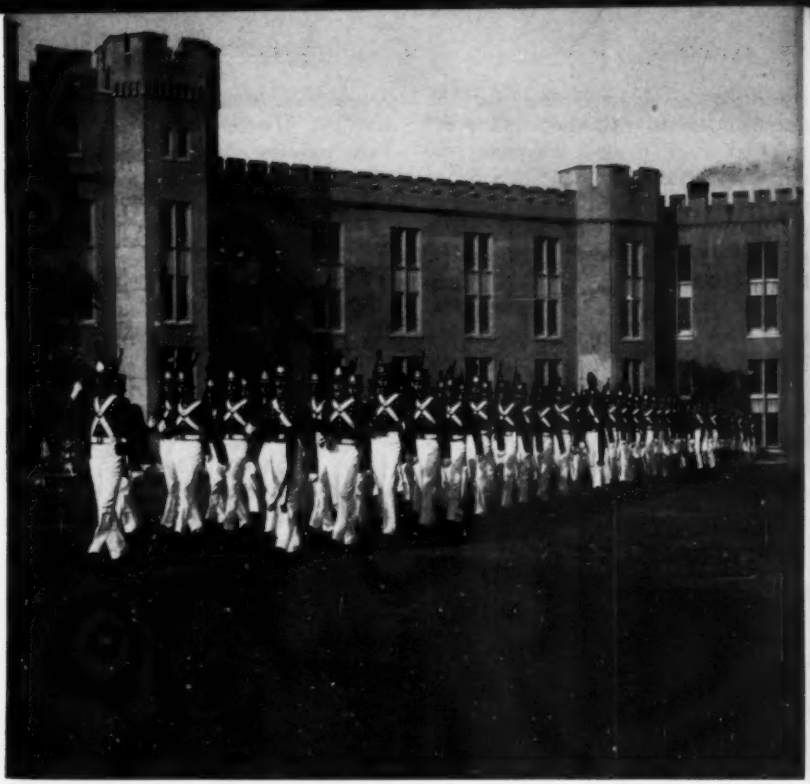
In-Service Education

Even though Air Force ROTC instructors have all completed the Academic Instructor Course prior to assuming their teaching duties, each unit maintains an intensive in-service education program.

The Academic Instructor Course and the In-Service Education programs have been quite effective in the area of methodology. In the area of knowledge of subject matter, many Air Force ROTC instructors have developed much better backgrounds in the subjects they are teaching through taking closely related college courses. This plan has been encouraged when it can be done without interferring with their assigned duties. In fact during the summer of 1958 more than 100 Air Force ROTC instructors were excused from other summer duties to take full-time summer school courses on their own campuses in fields of study related to their teaching assignments.

Use of Civilian Educators

At present, ten civilian educators with special backgrounds and training in such areas as geography, audio-visual aids, evaluation, communications skills, curriculum development and in-service education are on the staff of Headquarters Air Force ROTC. In addition to the special competence of these civilian educators, they provide the program with educational continuity which is essential when dealing with a program that takes a minimum of four years to produce a graduate.



Credit: U. S. Air Force

At military institutions ROTC cadets are drilled and disciplined by the rigors of parade calisthenics. This is only one of the ground phases of training.

Assistance from Colleges and Learned Societies

Since Air Force ROTC has been under the Air University, much assistance has been received from colleges and learned societies. College professors have assisted and worked with the PAS and his staff in their in-service education programs and in individual courses. Many professors have served as guest lecturers in ROTC classes. In a few cases, civilian professors have taught entire courses such as in the area of Geography and International Relations. Air Force ROTC committees have been established by the National Society for the Study of Communication, the Association of American Geographers, and the American Political Science Associations. Since 1952 these committees have worked closely with Headquarters Air Force ROTC in developing courses, texts, and other course materials pertaining to an effective college-level program.

A Look Into the Future

Before becoming Commandant, Air Force ROTC, my only awareness of the program was my generally favorable impression of its graduates who had passed through my advanced fighter training wing. Now I am firmly convinced, as would be anyone else who has had the same opportunity to study the program at close range, that

Credit: U. S. Air Force

From the drill field the aspiring officer candidate progresses to the natural element of air power, the airplane. In the not too distant future the ROTC cadet will be involved in missiles and space vehicles as well.

in the Air Force ROTC lies the answer to the problem of improving the effectiveness of the future Air Force. If the Air Force is to secure the necessary numbers of carefully-selected young college graduates of high growth-potential for its officer corps, we must rely upon the Air Force ROTC to do the job for us.

The ROTC will provide the Air Force with the numbers of high-quality young officers who are needed every year. The big question is, can enough of them be retained? As a general proposition, those whom we regard as the most desirable for retention are also those who have the most tempting offers in civil life; consequently they are the hardest to retain. This is not limited to Air Force ROTC graduates, nor is it true only of the Air Force. Yet we do keep enough top-notch Air Force ROTC graduates to indicate that even the best ones can be persuaded to choose an Air Force career in preference to the opportunity to make a million dollars on the outside. Most of the persuasion must take place after graduation rather than before—our experience clearly shows that about all the ROTC can do is to motivate the

best ones to the point where, on commencement day, they are giving serious consideration to an Air Force career—"but I'll wait and see what it's like before I commit myself."

It is quite evident that many other problems will arise in the future in the conduct of the ROTC program. However, it is my firm belief that the Air Force and the universities concerned, who have common interests and responsibilities to society and to the defense of our democratic way of life, can jointly work out any foreseeable problems to the mutual satisfaction of both parties.

I have complete faith that the Air Force and the universities can not only continue with this partnership arrangement, but that the program can be improved; and that only by such close cooperation between the universities and the Air Force can we assure ourselves of the quality of the future officers upon whom depends the ability of the Air Force to fulfill its mission of maintaining peace throughout the world.

Modern Influencing Factors of Change —

"One final thought I would leave with you: the rapidity of change in our modern world. There are many examples, of course, but two, one industrial and one military, stand out in the context of what I have said.

"The industrial one is Near East oil. . . . It was this chance discovery, which in the short span of fifty years had a more profound effect on the industrial life of Europe and on world international affairs than had, perhaps, the events of any similar period in modern history. . . .

"The second example, the military one, is our own Air Force. On August 1, 1907, the War Department created an Aeronautical Division under the Chief Signal Officer. This Division consisted of one officer and two enlisted men. Only forty years later that three-man organization had expanded to become the predominent military arm of the United States. Never before in all history has so tremendous a military change taken place in so short a time."

From an address by Rear Adm. Hyman G. Rickover, USN, to the Overseas Press Club, December 5, 1957, in New York City.

HISTORY OF THE SCHOOL OF AVIATION MEDICINE, 1918-1958

By JEAN EVANS

Requirements for understanding the needs of medical science in aviation has ever been one of the most pertinent problems in the progress of aviation. A clean, clear understanding of this fact was lacking in the embryonic stages of the growth of flying, but recognitions came suddenly and swiftly, with the rapid build-up phase for World War I. Since that time research in aviation medicine has paralleled, and in some cases, outstripped the actual physical capabilities of the airplane and the men who fly them. Because we were suddenly able to send vehicles into outer space and are now on the threshold of manned exploration of space, attests to the vision of the guiding fathers in this field.

The progress and developments of science and technology has forced an even greater awareness of the problems and shortcomings of aviation medicine. To overcome past and current deficiencies in new areas, the School of Aviation Medicine at Randolph Air Force Base, Texas, conducts constant and continuous research into all phases and elements of flying.

Miss Jean Evans, Historian for SAM, presents the entire but concise and pertinent history of the growth of that organization from 1918 to the present. Miss Evans is a native of Blanco, Texas, where she graduated from high school. She received a B.A. in Economics in 1955 from St. Mary's University in San Antonio, and has done graduate work at Trinity University in San Antonio, where she is currently working on her Master's thesis. She has been with the School of Aviation Medicine since March 1950, and became the school historian in August 1956.

Continuously for the past forty years the School of Aviation Medicine has trained the medical personnel who look after the health of the military flyer and has investigated the human factors which limit the altitude and speed of flight.

The importance of the physical condition of a pilot as a factor in his ability to fly was recognized early in aviation history. In February 1912 the War Department, United States Army, issued its first instructions to all medical officers regarding the physical examination of candidates for aviation duty. The instructions began with these words, "All candidates for aviation duty shall be subjected to a rigorous physical examination to determine their fitness for such duty." Since the issuance of this first order much time and effort has been devoted

to the search for methods of determining a person's fitness for flying, and once he has been trained, ways to keep him fit to fly.

One of the earliest to recognize the medical problems of flying was General (then Major) Theodore C. Lyster, Medical Corps, U. S. Army. General Lyster, an ophthalmologist, began work on the physical standards for aviators in April 1914. Often referred to as the father of aviation medicine in America, he emphasized the importance of vision, ocular muscle balance, and the effect of refractive errors.

The United States entered World War I on 6 April 1917, and along with the over-all increase in the military forces, the Air Service began expansion. The use of aircraft as a weapon of war placed a new significance on the special medical questions of aviation. An Air Service Medical, Signal Corps, U. S. Army, was organized 28 April 1917. In May 1917 a revised physical examination for flight training applicants was issued. This examination had been worked out by General Lyster with the assistance of Maj. Isaac H. Jones and Maj. Eugene R. Lewis, both otologists. A great deal of study had gone into the preparation of the examination, but since there were no precedents to guide the physicians, many of the standards were set arbitrarily until experience could prove or disprove their validity.

Early Organizations

The position of Chief Surgeon, Aviation Section, Signal Corps, was created on 6 September 1917, and General Lyster was appointed to the position. He found that, despite the careful selection of students, the mortality rate from aircraft accidents among flying cadets at training centers in the U. S. was alarmingly high. The Allies in France were experiencing an even higher accident rate. The need for a thorough study of the physical aspects of pilot selection was urgent.

As a result, an Aviation Medical Research Board, consisting of four Army Medical Corps officers and one civilian was appointed by order of the Adjutant General, U. S. Army, on 18 October 1917. Dr. Yandell Henderson was chairman of the board, with Maj. John B. Watson, Maj. Eugene R. Lewis, Maj. William H. Wilmer, and Maj. Edward G. Siebert, as members. Dr. Henderson was an experienced investigator of the effect of high altitude on humans. He had led a research expedition to Pike's Peak, and the resulting data were a major contribution to aviation physiology. The Henderson-Pierce Rebreather, used extensively in early experiments to measure a flyer's tolerance of low oxygen tension, was developed by Dr. Henderson. The other members of the Board were all experienced military. physicians. Major Watson was a psychologist, Major Lewis and Major Siebert were ear-nose-throat specialists, and Major Wilmer was an ophthalmologist.

The delegated powers of the Board were as follows:

1. To investigate all conditions which affect the efficiency of pilots.

2. To institute and carry out such experiments and tests as will determine the ability of pilots to fly at high altitudes.

3. To carry out experiments and tests to provide suitable apparatus for the supply of oxygen to pilots at high altitudes.

4. To act as a standing medical board for the consideration of all matters relating to the physical fitness of pilots.

In accordance with this authority, the Board's first step was to begin

construction of a Laboratory at Hazelhurst Field, Mineola, Long Island. Six research departments were organized and directors appointed as follows: Otology—Lt. Col. E. R. Lewis; Cardiovascular — Maj. James L. Whitney; Physiology—Maj. Edward C. Schneider; Psychology — Maj. Knight Dunlap; Psychiatry and Neurology — Maj. Stewart Paton; and Ophthalmology—Capt. Conrad Berens, Jr.

While the Laboratory was being constructed, a medical mission headed by General Lyster went to Europe to learn of the work in aviation medicine carried out by the Allies. The group visited the combat area in France and observed firsthand the conditions under which the pilots lived and flew their planes. At that time a flyer had to obtain the permission of his commanding officer before seeking medical attention, and often avoided seeing a doctor for fear of being branded as lacking in courage. After a crash, the accepted practice was to order the pilot to take up another ship immediately, regardless of his physical and emotional state, to see whether or not he still had the guts to fly.

When General Lyster and his group returned to the United States in March 1918, they brought much valuable data and sample equipment. They also returned with the conviction that the problems of the pilot were not properly understood and that medical officers were needed to act as the flyers confidant and liaison with higher authority. They recommended that selected medical officers be given a course in aviation medicine and then assigned to flying units.

In the meantime the Laboratory at Mineola, called the Air Service Medical Research Laboratory, had been completed and began operations on 19 January 1918. Col. William H. Wilmer was Director of the Laboratory. A decompression chamber was installed and research on human tolerance of lowered oxygen tension was begun.

The term "Flight Surgeon" was adopted by the Laboratory on 11 March 1918 to identify those physicians devoting themselves to the health and well-being of flyers. The first courses of instruction to train flight surgeons were irregular and improvised. In May 1918 three students completed their training and were ordered to duty as flight surgeons. Of the three, all otologists, Capt. Robert J. Hunter arrived at his station first (on 8 May 1918) and historically is considered the first flight surgeon.

By June 1918 a great deal of experimental work had been done. Laboratory space had been expanded threefold and the staff increased. Research was devoted first to selection, and later to the study of the trained fiyer himself. An oxygen tolerance test was given to a large number of aviators and a great deal of the present knowledge in this field is derived from the basic work at Mineola. Methods to supply oxygen to flyers were a subject of much experimentation. Studies were carried out on the behavior of the heart and circulation while a subject was undergoing the stresses of changing altitudes. Arteriosclerosis and other heart irregularities were found to have an adverse effect on altitude tolerance, while a strong heart muscle and a highly efficient coronary circulation contributed to increased altitude tolerance. In ophthalmology, studies of accommodation, muscle balance, color vision, field of vision, steroscopic vision, and depth perception were carried out. The equilibratory function of the internal ear occupied the otologists. In

psychology, attempts were made to devise objective tests for use in determining whether or not an individual possessed the ability to become a good pilot. Neuropsychiatry work centered on the detection in the aviator of symptoms of nervous and mental diseases and the recognition of latent trends of temperament which would lead to inefficiency and low morale.

In addition to the research, the Laboratory was functioning as a school for the training of flight surgeons and physical trainers, and the course material was becoming better organized. Branch medical research laboratories with flight surgeons on duty were established at various flying fields to collect data.

Pressure of World War I

In early August 1918, General John J. Pershing cabled a need for medical assistance for his Air Service. There were approximately 3,000 American flyers in France, including 575 students. Aircraft accidents accounted for 74.6 percent of the fatalities among aviators, while only 24.8 percent were due to combat and 0.6 to disease.

A group of 34 officers and 13 enlisted men from the Laboratory were sent to France, arriving in late August. All had extensive research experience at Mineola. Colonel Wilmer commanded the units, which set up headquarters at Issoudun, France. A small pressure chamber plus fourteen tons of equipment were taken along. The physical condition and mental attitude of the aviators in France were generally bad. Pilots were overeating and underexercising. Morale was low and accidents were increasing. There was no medical check before flying and a pilot still had to obtain permission of his commander to go on sick call. A veteran flyer approached his ship with a feeling of fatalism.

The medical units set to work at once to put into effect lessons learned at the Medical Research Laboratory. By October the results of their work was apparent in a reduced accident rate and a marked improvement in the health and morale among the airmen. The end of the war on 11 November 1918 brought the work of the group to a close before they had time to use the pressure chamber and other equipment. A great deal of valuable data were collected, however, and brought back to the Research Laboratory.

After the Armistice the Laboratory was rapidly demobilized and stripped of personnel. In January 1919 Maj. Louis H. Bauer replaced Colonel Wilmer as Director of the Laboratory. Colonel Wilmer returned to civilian practice as an ophthalmologist. He achieved distinction as an eye surgeon, and founded the Wilmer Institute of Ophthalmology at Johns Hopkins University in Baltimore.

The name of the organization when Major Bauer took command was the Medical Research Laboratory and School for Flight Surgeons. In November 1919 it was moved to Mitchel Field, Long Island. While the School for Flight Surgeons was separate from the Laboratory, they were staffed jointly. Personnel assigned were responsible for research in their respective specialties and for instruction in the School.

With the peace came a general loss of interest in national defense and, consequently, budgets were cut and personnel strength lowered. The number of military men assigned to the Laboratory dropped from over one hundred in 1918 to less than 20 in 1920, with 20 civilians.

Despite these difficulties, Major Bauer reorganized the Laboratory and

staffed it with Regular Army Medical Corps officers to replace the Reserves who had returned to civilian life. He prepared a curriculum for a permanent, systematic course of instruction for flight surgeons and held the first regular class in May 1919. The curriculum for the course, which was of two months duration, was made up of ophthalmology, otology, physiology, cardiology, psychology, neuropsychiatry, and physics. It was designed to instruct medical officers of the Regular Army, National Guard, and Reserve in the fundamentals of aviation medicine and the efficient performance of the special duties of a flight surgeon. Much of the teaching load was taken over by civilians as the number of staff officers decreased.

Difficult Postwar Developments

An order issued by the War Department in February 1921 recognized the School for Flight Surgeons as a Special Service School, giving it equal status with the Medical Research Laboratory. As a Special Service School it was exempt from the jurisdiction of the Corps Area Commander, coming directly under the Chief of the Air Service.

Fire destroyed the Laboratory building on 19 March 1921. Almost all the records were lost, including data from the work in France during the war. Some equipment was saved. The fire occurred on Sunday, but classes resumed the following Monday missing nothing originally planned except the orientation and practical work in the low pressure chamber.

On 8 November 1922, the Air Service Medical Research Laboratory and School for Flight Surgeons was designated simply "School of Aviation Medicine," the name it carries today.

The course to train flight surgeons has been offered regularly since May 1919. Ordinarily a three month course, the length has varied from four months (1932-1939) to six weeks (1940). It has been called variously the Basic Course for Flight Surgeons, the Aviation Medical Examiner Course, and Primary Course in Aviation Medicine, the latter being its present designation. Until July 1940 all students were graduated as flight surgeons. Since 1940, however, a graduate of the course is required to serve as an Aviation Medical Examiner for a specified period, usually one year, before he is designated a flight surgeon.

The course curriculum has been repeatedly revised as new discoveries and techniques have occurred and as newer aircraft have become operational. The basic subjects have remained generally the same—psysiology, psychology, neuropsychiatry, ophthalmology, otolaryngology, biophysics, and cardiovascular—but the content and application have changed considerably over the years.

Until they established their own School of Aviation Medicine at Pensacola, Florida, in 1939, the Navy detailed officers to the School for training. Fifty-six Naval officers were graduated from 1922 until 1939. Foreign medical officers have been permitted to take the course since 1923. The first foreign physician, a Brazilian Naval Officer, was graduated from the course in December 1923. After the Air Force became a separate service in 1947, the Army continued to send its officers to the School, and Army surgeons regularly make up a part of the student body.

An Extension Course to train Reserve and National Guard officers as flight surgeons was inaugurated in 1923. Didactic instruction was given by correspondence followed by a month to six weeks clinical and prac-

tical work at the School. Ordinarily two years were required to complete the course in this manner, and to qualify as a flight surgeon. The exigencies of mobilization caused the discontinuance of this program in 1940. It was never considered a very satisfactory method of instruction, but served a useful purpose in helping to overcome the shortage of flight surgeons between the two wars.

Faculty members have been chosen on the basis of their records as students and for their personality, knowledge and interest in the special field of aviation medicine. An attempt has always been made to utilize the best available talent in the ranks of flight surgeons as instructors.

During World War I a course to train enlisted men to assist the flight surgeons was organized. A flight surgeon could not perform his duties effectively and efficiently without well trained enlisted men to help in administering the physical examination for flying and accomplishing the various physiological, ophthalmological, and psychiatric testing. The first enlisted men's course, called the Flight Surgeons' Assistants Course, was of two months duration. It was the forerunner of a large number of enlisted men's courses which have been offered, as the need has arisen, over the years. Laboratory technicians, air evacuation specialists, medical administrators, X-ray technicians, veterinary specialists, equipment repairmen, and preventive medicine specialists, are among the many courses which have been offered for airmen.

Air evacuation was first recommended by the School staff in 1921, but was turned down by the Chief of Air Service. The crash of one of the more advanced airplane ambulances in a severe electrical storm near Morgantown, Maryland, on 28 May 1921 killed seven officers and enlisted men. This unfortunate accident set back the development of air evacuation for at least a decade.

Continued Research

Research continued after the war despite a slim budget and shortage of investigators. Each department operated as a separate unit. Most of the work was done in physiology, as it was the only department with the equipment, personnel, and time available for intensive study. The Schneider Index was first described by Maj. E. C. Schneider in 1920, as a means of recognizing individuals not physically suited for flying training. The Index was a test of the cardiovascular system which was believed to give precise clues as to a man's general fitness. This test was incorporated into the regulation defining the medical examination of the Air Service and was retained as a part of the physical exam until 1943. The physiologists also studied the effects of exercise and fatigue on work performance and carried out experiments in the low pressure chamber.

Neuropsychiatric research dealt with the problems of acute neurosis and nervous disturbances in flyers. In 1925 about 80 percent of the groundings of graduate pilots were attributed to nervous instability. The investigators came to believe that a personality test would be the answer to the problem. Maj. R. F. Longacre did outstanding work in this field by outlining a comprehensive personality test for use in the examination for flying. Maj. Frederic H. Thorne developed the Thorne Reaction Time Apparatus to measure simple and discriminative time in hundredths of a second.

Ophthalmologists were interested in the design and construction of aviation

goggles. Otologists searched for a satisfactory ear plug as protection against noise.

The failure of the physical examination to weed out those unable to fly brought about a shift in research emphasis after 1925 from an intense concentration on physiology and low pressure chamber work to the fields of psychology and neuropsychiatry. Research centered on the problem of devising a battery of objective tests for selection of students for flying training.

All physical examinations for flying were conducted at the School. The examinations were made by specialists in the various departments. The staff also was responsible for regular revision of the physical examination, keeping it abreast of the latest knowledge and research.

After seven years as Commandant, Major Bauer left in September 1925 to become the first Medical Director of the Aeronautical Branch of the Department of Commerce (now the Civil Aeronautics Board). He saw the organization achieve a permanent status as an educational institution. In 1926 Dr. Bauer published the textbook, *Aviation Medicine*. Based on research and experience in the laboratories and classrooms of the School, the book was the first on aviation medicine in the United States and first in the world since the war. Dr. Bauer left the Aeronautical Branch and entered private practice as a cardiologist in Hempstead, New York, in 1930. He did not, however, forsake aviation medicine. His interests remained active and he devoted much time and energy to establishing aviation medicine as a specialty. He served terms as President of the American Medical Association, the Aero Medical Association, and Secretary General of the World Medical Association. For his work in aviation medicine, Dr. Bauer was honored by the John Jeffries Award of the Institute of Aeronautical Science in 1940, and the Theodore C. Lyster Award of the Aero Medical Association in 1947. He is a member of the founders group of specialists in aviation medicine.

Maj. Francis H. Poole succeeded Major Bauer as Commandant in 1925. The nine-year period from 1925 to 1934 was a difficult one for aviation medicine. At the beginning of this period the number of staff officers fell to six and the civilians to eight, with four enlisted men. The School budget for 1926 was $17,619.00 and by 1934 was only $12,026.00.

To San Antonio

The School was moved from Mitchel Field to Brooks Field, Texas, in August 1926. The elimination rate among cadets had been extremely high and it was believed that if the Laboratory were located at the site of the training center (then in San Antonio, Texas) more effective work could be accomplished. Cadets could be examined and tested when reporting for duty and then followed closely through their flight training.

At Brooks the School became a part of the concentrated Air Corps training center, which was made up of the Air Corps Primary Flying School and the Advanced Flying School. It occupied the Big Balloon Hangar on Brooks until mid-year 1927, when it was moved into a new building constructed especially for its occupancy.

After five years at Brooks, where the small staff devoted most of its time to administering the physical examination for flying and training flight surgeons, the School was moved to Randolph Field in October 1931. It became an independent station under

the Air Corps Training Center and occupied a large, new classroom building on the base. At Randolph, better accommodations were available for study and research, as well as room for expansion. Maj. B. B. Warriner, M.C., U. S. Army, was Commandant when the organization was moved to Randolph. He was succeeded by Lt. Col. A. P. Clark, M.C., who took command in September 1932.

Until 1932 there was practically no attempt to plan a coordinated research program. Lack of facilities and equipment precluded research on a large scale. During the months when practical instruction was given, it was next to impossible to carry out research work of any kind. Late in 1932 the Commandant directed that the research activities be evaluated with a view toward organizing an integrated program. The staff outlined areas of needed research, coming up with ideas for 25 separate studies. Many of the problems would have involved years of study, making it a program for a large research laboratory—not for a half dozen officers part time.

Col. A. D. Tuttle, M.C., who succeeded Colonel Clark as Commandant in June 1934, continued the efforts to organize the research program. A coordinator was assigned each project and a system of record keeping put into effect. Besides work on psychological testing, experiments were being done on aviation goggles, vision in the aging pilot, night vision, cockpit lighting, color blindness, and the development of a flight surgeon's kit. Little work was done in physiology because of lack of trained personnel, funds, and a pressure chamber.

In 1934 it became apparent that the work of the School of Aviation Medicine and the Physiological Research Unit, Materiel Division, Wright Field, Dayton, Ohio, had begun to overlap in some areas. In an attempt to prevent duplication of effort, a division of work was agreed to between the School and the Physiological Research Unit whereby the latter would have responsibility for the development of equipment and the School would pursue studies on personnel factors having to do with selection, classification, and maintenance of the flyer. After 1935 the School did no further work on equipment development, except to assist the Materiel Division in testing newly developed clothing and equipment prior to its standardization.

The isolationist outlook of the country which prevailed during the 1930's was not conducive to the growth of aviation medicine. The public, secure in its location, felt no need for an air service. The morale of the flight surgeons reached a low point in 1939. It was becoming progressively harder to persuade physicians to take the course in aviation medicine. Also, the flight surgeons had been removed from flying status in 1935. Sixteen of their number had been killed in aircraft accidents, and they felt they were called upon to bear the hazards of their profession without just compensation. The close association with the pilots, which came about through the shared experience of flying was lost as well.

The Impetus of War

Lt. Col. Fabian L. Pratt, M.C., was appointed Commandant in March 1939. The war in Europe forced the United States to begin mobilizing its forces in 1940. To keep pace with the expanding Air Corps, the School planned an enlarged program calling for ten officers, sixteen enlisted men, and ten civilians. Flight surgeons were restored to flying status. The augmented program was begun in April 1941. Authority and funds were requested to construct a permanent

building on Randolph, designed especially to house the research laboratory.

On 20 January 1942, a Research Section was formally established by Brig. Gen. Eugen G. Reinartz, M.C., then Commandant, with Maj. (later Major General) Harry G. Armstrong, M.C., as Director. The research departments of physiology, psychology, psychiatry, biochemistry, biophysics, pharmacology, ophthalmology, clinical investigation, otolaryngology, pathology, statistics, physical education, and dentistry were formed. A machine shop and aeromedical library were included to support the research efforts. Recruiting a research staff had begun previously in October 1941. It was a difficult problem to find people to staff the highly specialized laboratory.

The research building was opened officially on 2 April 1943. Twenty-seven officers and 35 civilians were on hand to staff it. The building, with its temperature and humidity control, provided excellent conditions for research work. It also contained electroencephalogram units, X-ray laboratory, and sound isolated rooms. Animal facilities for small animal experimentation were provided for the first time in the same building with the research laboratories. By May 1943 one large and three small decompression chambers were installed in the basement of the research building. This was the first time since leaving Mitchel Field 17 years previously that the School had an altitude chamber. This allowed broadening the research program to include work on anoxia and related subjects.

Practical studies were stressed during the early war period. Many research problems emanated from field and combat experience, and consequently came down through directives from the Office of the Air Surgeon.

Credit: U. S. Air Force

Research for the answers which must be found in all aspects of aviation medicine carries the personnel of SAM to the far reaches of the earth; into the jungles of the tropics, into arid deserts and wastelands, and even to the high and snowy mountains of the world.

Investigators from the School's laboratories were not allowed to carry out studies in the combat areas, as they did in World War I. Research expeditions to the scene of fighting were proposed, but were turned down by higher authority.

Wartime research shifted from the emphasis on selection to a more balanced program. Among the many studies carried out were color perception; night vision, effect of adverse conditions on visual acuity; effect of aircraft noise and gunfire on hearing; treatment and prevention of inner ear infections; auditory standards; trials of antimalarial drugs; motion sickness; trials of new antibiotics and drugs; effect of carbon monoxide in cockpits;

simple, practical methods of selection and classification; decompression sickness; evaluation of oxygen masks; pressure breathing; effect of centrifugal force on man; chemical control of respiration; high altitude frostbite; physical fitness; and fatigue.

A pathology laboratory was added in January 1943 enabling the study of surgical and autopsy specimens from victims of aircraft accidents. The AAF School of Air Evacuation, Bowman Field, Kentucky, was transferred to the School of Aviation Medicine in October 1944, and the training of flight nurses was incorporated into the program. A Department of Air Evacuation was set up and studies on loading procedures, sanitary apparatus, in-flight feeding and equipment for patient comfort were begun. Also in 1944, problems of tropical medicine came under investigation. A bacteriology laboratory, organized to study diarrheal control, Salmonella infections, and the resistance of organisms to drugs, began functioning in March 1945.

For a time during the War the station hospital on Randolph was transferred to the jurisdiction of the School for use as a clinical facility. A close liaison was always maintained with hospitals in the San Antonio area, both civilian and military, and the facilities of these institutions used for clinical consultations.

After World War II the organization experienced the same rapid demobilization and loss of public interest as in 1918. During the war period there were never more than a few Regular Army officers assigned, and of these only one or two were engaged in research. The staff was made up almost entirely of Reserve officers who returned to their civilian pursuits as soon as they were released. There was no career in the Army for scientific investigators. Aeromedical research was not recognized as a military career.

Maj. Gen. (then Colonel) Harry G. Armstrong followed General Reinartz as Commandant, taking office on 18 July 1946. General Armstrong was eminently qualified for the job of rebuilding the School after demobilization. He established the Aero Medical Laboratory at Wright Field in 1935 and served as its Director until 1940. He pioneered research on the physiology of flight at extreme altitudes. For his achievements, he received the Wellcome Award of the Association of Military Surgeons in 1937, the Collier Trophy in 1939, the John Jeffries Award in 1941, and in 1949 the Theodore C. Lyster Award. In 1939 he wrote a textbook, *Principles and Practice of Aviation Medicine,* which has become a classic in aviation medicine literature. This book, which was revised in 1943 and again in 1952, is the standard modern text on the subject in use today.

In 1941-1942 General Armstrong served as Director of Research at the School. He returned in July 1946 after serving as Surgeon of the Air Division at the Office of Military Government for Germany in Berlin. While in Germany, General Armstrong became familiar with the work accomplished by the German aviation medicine specialists during the War, including the work of Dr. Hubertus Strughold. After he became Commandant, General Armstrong, under an arrangement termed "Project Paperclip," brought a group of German scientists to the School for employment. About twenty-five of the "Paperclip Personnel" joined the staff, among them Dr. Strughold, a physician and physiologist who was Director of the Aeromedical Research Institute in Berlin from 1935 to 1945.

On 1 April 1946 the School was

transferred from the Air Training Command to Air University Command. By this transfer, it became the graduate medical department of Air University, the educational and doctrinal center of the Air Force.

After the war the lack of facilities and scientists made it necessary that urgently needed research work be accomplished at civilian institutions. A system was inaugurated whereby specific pieces of research were contracted out to civilian universities and research organizations.

Peacetime Growth and Expansion

Despite the peacetime readjustment, the School outgrew its facilities and spilled over into random temporary buildings scattered about Randolph. Convinced that aviation medicine was not a science nurtured only by war, but that its growth must parallel the engineering developments of the aircraft industries, General Armstrong felt it should have a permanent home where it could expand normally. After detailed study and coordination with other aeromedical specialists, he formally proposed, in August 1946, the establishment of an "Aeromedical Center" to provide for the teaching, research, and clinical practice of aviation medicine.

Space medicine research was begun in 1947. Soon after he joined the staff, Dr. Strughold, along with Dr. Heinz Haber, an astrophysicist, began to investigate the medical problems involved in flights outside the atmosphere. General Armstrong was very much interested in this work and encouraged its expansion and development. The first panel discussion on the aeromedical problems of space travel was held at the School on 10-12 November 1948. This meeting, which was arranged by General Armstrong, brought together prominent physiologists and psychologists to collect and discuss the latest information on the subject.

By 1949 the work in space medicine had grown to such proportions as to merit the formation of a Department of Space Medicine, which was announced by General Armstrong on 9 February 1949. The General headed the Department until his departure to become Surgeon General of the Air Force in May 1949. Dr. Strughold then became head with Dr. Haber as a staff member. Some months later Dr. Konrad Buettner joined the department, and Dr. Fritz Haber, brother of Heinz, began work with the group in the spring of 1950.

The initial studies were purely theoretical, with interest focused on a definition of space. Drs. Strughold, H. Haber, Buettner, and F. Haber collaborated on the question and published a paper entitled, "Where Does Space Begin? Functional Concept of the Boundaries Between Atmosphere and Space," which became a point of reference for much of the later work. In June 1949 studies were begun to determine the effects of reduced gravity or weightlessness. The Haber brothers conducted the initial studies of this phenomenon at the School.

General Armstrong was called to Washington to become the second Surgeon General of the Air Force in May 1949, and his successor as Commandant was Maj. Gen. (then Colonel) Otis O. Benson, Jr., USAF (MC). General Benson, a military surgeon since 1930, had an extensive background in aviation medicine. In 1939-1940 he took postgraduate training in physiology at Mayo Clinic and the Fatigue Laboratory of Harvard University. He served as Chief of the Aero Medical Research Laboratory, Wright Field, from 1940 to 1943. During the last two years of the War he served first as Surgeon of the Fif-

teenth Air Force in North Africa and Italy, and later as Surgeon of the Air Forces in the Mediterranean.

On 21 June 1949 an Aeromedical Planning Board, under the chairmanship of General Benson, was appointed by the Surgeon General to formulate "ideal" plans for an Aeromedical Center. The findings and recommendations of this Board, completed in September 1949, were published as the "Report of the Aeromedical Planning Board on an Aeromedical Center," and were used as the basis for the original design of this facility.

The Korean crises with its concomitant remobilization brought about an increase in the aviation medicine program. By 1950 the School had completely outgrown its space at Randolph and could expand no further. After the consideration of several courses of action, including moving the whole organization to another base, it was finally decided to divide it into two segments, transferring most of the education activities to Gunter Air Force Base, Montgomery, Alabama. The split was accomplished in October 1950. Headquarters for the School remained at Randolph, where the research laboratories are located. All courses except the Primary Course in Aviation Medicine and Advanced Course were moved to Gunter and organized into the 3882nd School Group, Gunter Branch-School of Aviation Medicine. The courses transferred to Gunter included the Flight Nurse Course, Physiological Training Officers Course, and all enlisted men's courses. The division of the organization was not meant to be a permanent arrangement. The Aeromedical Center planners intended to reunite the two sections when the Center became a reality.

The research program by 1950 was made up of a great variety of projects. Among them were the following: human factors in aircraft accidents, air evacuation, means of producing zero and subgravity states, the human body in space, escape and survival at high altitude, influence of fatigue on work performance, dental filling materials and dental instruments, mechanisms of natural acclimatization to altitude, effects of reduced oxygen pressure, rapid identification of microorganisms, biological and medical aspects of ionizing radiation, visual depth perception, more effective runway markings and aircraft insignia, visual problems of high speed flight, color vision, treatment of frostbite, clinical tests for atherosclerosis, motion sickness, explosive decompression, psychiatric selection of flying personnel, and radiation sickness.

A Radiobiological Laboratory was established at Austin, Texas, by the School of Aviation Medicine and the University of Texas in March 1950. This Laboratory, staffed and funded jointly by the School and the University, was set up for special study of the effects of ionizing radiation on living organisms and the prevention and treatment of radiation injury. This work, which has been coordinated closely with the Atomic Energy Commission at Oak Ridge, Tennessee, has resulted in many discoveries important in defense against nuclear attack.

To encourage the interchange of information among scientists of varied fields of interest related to aviation medicine and space medicine research, the first large, internationally advertised Symposium on the Physics and Medicine of the Upper Atmosphere was organized and sponsored jointly by the School and the Lovelace Foundation for Medical Education and Research of Albuquerque, New Mexico. The meeting was held in San Antonio,

6-9 November 1951. The primary objective was to collect all available data needed to form a background essential to the planning of aeromedical research and to allow manned flights into and beyond the outer fringes of the atmosphere.

The material presented at this meeting was documented in book form and published by the University of New Mexico Press in 1952. Entitled *Physics and Medicine of the Upper Atmosphere*, the work was composed of 21 chapters containing contributions from 34 scientists and covered the fields of aviation medicine, radiobiology, upper atmosphere physics, toxicology, and aeronautical and astronautical engineering.

A contract was entered into with the University of Texas in 1952 to explore the possibility of using *algae* to produce sufficient oxygen to support a human being sealed in the cabin of a spaceship. In the spring of 1952, plans were made to procure and install a sealed cabin simulating the inside of a space vehicle. The cabin, built especially to study the human body in a closed ecological system at simulated heights of 80,000 feet and above, was delivered to the School in August 1954, and was installed in the basement of the research building.

A set of detailed plans and specifications for the Aeromedical Center were completed in 1951. As originally designed, the Center was to consist of five main buildings, plus housing and supporting services, costing (at 1951 price levels) $30,000,000. In various reviews by the Air Staff, it was decided to divide the construction into three increments or "packages," and to request authority for building the first and second packages but to request funding for only the first increment. The third increment was deferred indefinitely. Subsequent review by the Bureau of the Budget deleted the requested authorization for the second package and reduced the funding for the first package from $10,084,000 to $8,000,000. In July 1952, Public Law 534 passed by the 82nd Congress authorized $8,000,000 for construction of facilities for the School of Aviation Medicine at Brooks Air Force Base, Texas.

Considerable redesign of the first increment was necessary in order that all essential functions would be included so the Center could become operational, at least on a temporary basis. (After 1954 the term "Aeromedical Center" was dropped in favor of the more easily understood designation "New School of Aviation Medicine.") In August 1952 a Planning Team, headed by Col. Frederick J. Frese, Jr., USAF (MC), who had worked on the plans since 1946, was formed at the School to determine the facilities to be included in the initial construction.

On 24 October 1952 the School of Aviation Medicine mission was expanded to include, in addition to education and research, the specialized practice of aviation medicine. Under the specialized practice a consultation service is offered for difficult or borderline diagnostic problems encountered by surgeons in the field. This service has devolped to the extent that specialists examine an average of 400 consultation patients per year.

Preventive Medicine

Aviation medicine passed another milestone in its history when on 8 February 1953 the American Board of Preventive Medicine was authorized by the American Medical Association to establish aviation medicine as a specialty in the field of Preventive Medicine and to grant specialty cer-

tification to physicians who are properly qualified in aviation medicine. This culminated nearly ten years planning and effort on the part of aeromedical leaders to secure recognition of aviation medicine as a medical specialty. Among those who led in the campaign were General Armstrong; Dr. Bauer; General Benson; Capt. Wilbur Kellum of the U. S. Navy Medical Corps; Dr. Jan H. Tillisch of the Mayo Clinic staff and Medical Director of Northwest Airlines; Dr. Conrad Berens, pioneer flight surgeon and noted New York eye specialist; Dr. Walter L. Bierring, Chairman of the American Board of Preventive Medicine; and Dr. Ernest L. Stebbins, Secretary-Treasurer of the American Board of Preventive Medicine. Dr. Berens and Dr. Tillisch were each former School staff members. General Benson became the first Vice Chairman for Aviation Medicine of the American Board of Preventive Medicine. This marked the first time a branch of medical science, starting as a strictly military study, attained formal status as a medical specialty.

A training program consisting of four phases was instituted in the educational program to qualify physicians for the specialty of aviation medicine. Phase I is a year's graduate work in preventive medicine at a civilian institution. Under a special arrangement, this training is given by Johns Hopkins and Harvard Universities. Phase II is the Advanced Course in Aviation Medicine, of nine months length, offered at Randolph. A Residency in Aviation Medicine constitutes Phase III, and Phase IV consists of a period of Supervised Practice. Training under the last two phases is conducted at Randolph to the extent its staff and facilities permit, with the remainder provided through affiliation with the surgeons of major air commands and numbered air forces.

General Benson went to Washington, D. C., to become Chief of Medical Staffing and Education, Office of the Surgeon General, in April 1953. The author of over 20 professional papers dealing with aviation medicine, General Benson achieved wide recognition as an aeromedical practitioner. For his achievements, he was awarded the John Jeffries Award in 1951 and the Lyster Award in 1955.

Brig. Gen. Edward J. Kendricks, USAF (MC), was appointed Commandant in May 1953. General Kendricks, a dedicated military physician of 23 years experience, had served tours as Surgeon of the Ninth Air Force in Egypt from 1942 through 1945; as Chief of the Aero Medical Laboratory, Wright Field from 1946 through 1949; and as Director of Medical Staffing and Education, Office of the Surgeon General, 1949 through 1953. He died of a heart attack on 17 February 1956 before his tour as Commandant was completed.

General Benson was recalled to his former position and arrived in September 1956 to assume direction of the institution. He presided over groundbreaking ceremonies for the construction of the New School of Aviation Medicine at Brooks Air Force Base on 10 May 1957, climaxing a ten-year effort on the part of aeromedical leaders to secure a proper home for the growing science of aviation medicine. Construction of five buildings, totaling eight million dollars, was begun. This first increment consists of a Flight Medicine Laboratory, Academic Building, Research Institute, Research Laboratory Shops, and cooling and heating plant. The estimated completion date is July 1959, when the Randolph headquarters will return to Brooks. Several of the Gunter Branch courses will also be transferred.

A New Field—Space Medicine

On 1 July 1957 Dr. Strughold moved up from his post as Chief of the Department of Space Medicine to become Advisor for Research for the School. Over the previous ten years, he had carried out both practical and theoretical work in space medicine. Experiments in the space cabin simulator were begun in early January 1956. A subject spent 24 hours sealed in the cabin during a test run in March of that year. The work progressed over the following two years to the point where a subject was able to remain inclosed in the cabin for seven days on 9 through 15 February 1958. This experiment, in which Airman Donald G. Farrell acted as subject, attracted widespread attention in the press.

By July 1958 the Department of Space Medicine outgrew its departmental status and was organized into a division containing four departments. Col. Paul A. Campbell, USAF (MC), was appointed Chief of the Division of Space Medicine. Colonel Campbell, a pioneer worker in space medicine research, had previously served two tours as the School's Director of Research, the first from 1942 to 1945 and the second from 1950 to 1953.

Presently the School of Aviation Medicine headquarters at Randolph consists of five major divisions, i.e., Aviation Medicine, Clinical Medicine, Dental Sciences, Medical Science, and Space Medicine. Major General Benson heads the institution as Commandant with Col. Robert H. Blount, USAF (MC), as his Deputy. The divisions are subdivided into departments, totaling 24 at this time. One hundred seven officers, 284 airmen, and 206 civilians are permanently assigned to operate the organization at Randolph with a weekly average of 115 students. Of a professional staff of 129, 45 are Doctors of Medicine, 34 are Doctors of Philosophy, 9 Doctors of Dental Science, and 6 Doctors of Veterinary Medicine. Air University conferred academic rank on the faculty in March 1958, creating eight full professors, eleven associate professors, and five assistant professors. Among the full professors is the world's first Professor of Space Medicine, Dr. Hubertus Strughold.

Three courses are offered at Randolph—the Primary Course in Aviation Medicine, nine weeks in length and offered four times per year; the Advanced Course in Aviation Medicine, of nine months duration, and offered once per year; and the Refresher Course in Aviation Medicine, of one week's length and given twice per year. Residency training and specialized practice are also offered. Since the beginning of the basic or primary course for flight surgeons, 8,862 students have been graduated, including 312 foreign physicians representing 45 different countries. Many of the medical directors of the larger airlines are graduates of the School.

Among the supporting services for the institution is an Aeromedical Library containing 41,162 books and bound periodicals; a research photography shop equipped for both still and motion pictures; and a research machine shop manned by highly skilled machinists and instrument makers.

The research budget for Fiscal Year 1958 totaled two million, five hundred thousand dollars. Under investigation in the laboratories are 85 different research projects, with 75 others contracted out to civilian institutions. The projects are too numerous to list in detail, but broadly include the following: unexplained loss of consciousness; vectorcardiographic studies of cardiac function and disease; electrocardiogram repository; prevention and treat-

ment of dental diseases; new materials and devices for dental care; noise induced hearing damage; hearing data repository; test techniques for hearing loss; psychological tests to determine adaptability and proficiency for flying duties; use of algae to produce oxygen for closed ecological system; visual acuity at high angular speeds; visual orientation in space; closed cerebral injury; methods to measure fatigue and stress; respiratory and circulatory disturbances of high altitude; rapid decompression; physical fitness in Air Force personnel; mechanisms of natural acclimatization to altitude; effects of heat on man; hypoxia; chemical tests for atherosclerosis; biochemistry of tissue trauma; effects of drugs on airborne personnel; body shielding against ionizing radiation; physiological aspects of ionizing radiation; radiation injury; biological effects of cosmic rays; ionizing radiation hazards to aircrews in the operation and maintenance of nuclear powered aircraft; biological effects of zero gravity; effects of drugs on psychological processes; studies in the space cabin simulator; physical requirements for manned rockets and artificial satellites; and bioclimatology of space flight.

The Gunter Branch-School of Aviation Medicine, under the command

Credit: U. S. Air Force

One aspect of the preliminary testing program for space research which is continually being conducted at the School of Aviation Medicine, Randolph Air Force Base, Texas. In the right rear is a view of the first space simulator.

of Col. Fratis L. Duff, USAF (MC), has a staff of 118 officers, 256 airmen, and 96 civilians. The student load averages 820 per week. Fourteen courses for officers are given at Gunter, among them the Basic Orientation Course for Officers of the Medical Service, Primary Course in Air Force Medicine, Physiological Training Officer Course, Flight Nurse Course, Clinical Laboratory Officer Course, Basic Course in Medical Administration, Medical Supply Officer Course, and Veterinary Officer Basic Course.

Twenty-eight courses for enlisted men are conducted, 15 at the supervisor-technician level and 13 at the apprentice-specialist level, including courses for medical equipment repairmen, aeromedical and physiological training specialists, radiology technicians, medical laboratory technicians, medical administrators, preventive medicine specialists, veterinary specialists, and dental technicians.

During its forty years operation, the School of Aviation Medicine has survived many crises—budget cuts, personnel losses, fire, postwar lack of interest. Through the capability and perseverance of a small group of dedicated flight surgeons, it has become the center of a new science. Aeromedical leaders look forward to even greater progress as they prepare to move into the new facilities on Brooks Air Force Base.

Thought Provoking Quotations:

"Any person in this country willing to face the truth knows that the Communists are making war upon us now—today—using diplomacy, economics, psychology, subversion, in short, every known political and social weapon.

And our people have been deluded and lulled into a false sense of security because there are no bombs exploding and no blood being shed, except in places like Beirut, and Indonesia and Algiers."

—Hon. Stuart M. Symington, in a speech in Florida, July 12, 1958.

"The growing inability to respond promptly and energetically to obvious threats is a characteristic symptom of a declining society. Only rarely has a great nation been destroyed by one dramatic blow. Defeat was preceded nearly always by a slow erosion of the will to resist aggression from without and by a weakening of its own people's sense of common purpose."

—Dr. Robert Strausz-Hupé, *U. S. News and World Report,* June 6, 1958.

THE AIR FORCE EXTENSION COURSE INSTITUTE

By COLONEL JOHN A. McCANN, USAF

Military leaders of today and tomorrow must be more than "hot pilots" or doughty survivors of battles in the air, on the ground, or over the seas. In these days of hot peace or cold war, vital U. S. military responsibilities are being entrusted to officers who understand the nature, scope, and hazards of U. S. leadership in the free world. Aside from the college of "hard knocks" there are two formal educational approaches to gaining this understanding. For a select fortunate few, the War Colleges maintained by the individual services and the Department of Defense offer one opportunity, while correspondence schools offer the other opportunity for the ambitious and diligent among those who do not attend resident institutions.

The Air War College Extension Course is offered by USAF's Air War College which conducts the top level resident course of instruction in the Air University system. In 1958 the Air War College Faculty completes ten years of experience in correspondence education in one of the most vital areas of military leadership development.

Colonel John A. McCann who is the Air War College Deputy for Extension Courses, is fully qualified to deal with this subject. After his formal education at Miami University in Oxford, Ohio, where he received both his AB and MA degrees, Colonel McCann entered the U. S. Air Corps as a 1st Lieutenant in 1942. He returned to civilian life and his business in investment banking in 1946. This respite was short-lived, however, for he was recalled to active duty in October 1950, when his Reserve unit, the 433rd Troop Carrier Wing of Cleveland, Ohio, was recalled. He graduated from the Air War College with the 1952 class, served four years at Headquarters USEUCOM in Europe, and then was recalled to serve on the faculty of the Air War College.

I. Education by Correspondence

First serious attempts to impart education beyond the ivy seclusion of universities were made in England when an occasional lecturer from such institutions went abroad to address classes of laymen in nonscholastic language in the early 1800's. Earliest evidence of the correspondence school, as such, is contained in this excerpt: "In 1856 Charles Toussaint, a Frenchman teaching his native language in Berlin, and Gustav Langenscheidt, a German writer and member of the Society for Modern Languages in Berlin, combined to found a school for the teaching of languages by correspondence."[1]

[1] John S. Noffsinger, Correspondence School, Lyceums, Chautauqua, New York: The Macmillan Company, 1926, p. 4.

Among the earliest U. S. organizations interested in education by correspondence was the "Society to Encourage Studies at Home" founded in 1873.

By 1941, over 100 colleges and universities were engaged in furnishing correspondence type instruction to several hundred thousand students each year. By 1946, over 700,000 students were enrolled in over 200 private correspondence schools (not colleges or universities) in the United States.

A recent series of articles in *The Popular Science Magazine* states that in 1957 over 1,200,000 U. S. citizens were "Upgrading their skills or learning new trades from schools they never visited and teachers they never saw."[2]

II. Military Correspondence Schools

While correspondence school instruction has been utilized successfully by the military services for many decades, this type of instruction received its greatest impetus during World War II. Since 1941, over 1,100,000 service men and women have enrolled in correspondence courses sponsored by the Services, exclusive of those courses offered by individual services directly. This instruction is offered either directly through the Armed Forces Institute, an instrumentality of the Department of Defense, located at Madison, Wisconsin, or through universities, colleges and approved private schools cooperating with this military program.

As to the correspondence effort of the individual military Services, it is estimated that the U. S. Navy, through its Naval War College and two small specialized correspondence schools, currently serves approximately 300,000 enrollees. The U. S. Army through a system of individual Corps Schools offers correspondence instruction to over 100,000 students, while the U. S. Air Force provides a wide range of vocational, technical, and general correspondence education to over 200,000 of its members through its Extension Course Institute.

III. Extension Course Institute

Shortly after achieving autonomy in September of 1947, the United States Air Force originated its own study program. Continental Air Command created six separate extension course schools which were consolidated in 1948 with headquarters initially at Offutt Air Force Base, Nebraska, and later at Fort Benjamin Harrison, Indiana. Course materials were chiefly concerned with general military subjects and the student body was composed largely of Reserve Officers.

In 1950 responsibilities for Extension Courses were incorporated into those of the Air University. In the same year, Air University Command founded the Extension Course Institute at its present location, Gunter Air Force Base, Montgomery, Alabama. This location is in close proximity to Maxwell Air Force Base, Alabama, from which the Air University directs all the educational programs, as differentiated from training programs, of the U. S. Air Force.

ECI offers approximately 90 different correspondence courses paralleling Air Force resident instruction.

Courses offered fall into two main categories, namely: general military education and specialized courses, listed by career areas. General military education offered consists of the following four large courses:

(1) The Officer Candidate School Correspondence Course, paralleling resident Officer Candidate School instruction as provided at Lackland Air

[2] Martin Mann, "Plain Facts About Correspondence Schools," *Popular Science*, February 1958, p. 127.

Force Base, Texas, under the Air Training Command;

(2) The Squadron Officer School Correspondence Course;

(3) The Command and Staff School Correspondence Course; and

(4) The Air War College Extension Course.

The last three of these courses parallel the resident instruction in the Air Command and Staff College and the Air War College of the Air University at Maxwell Air Force Base, Alabama. At their respective levels, these general courses stress leadership, the techniques of command, and an understanding of air power, its organization, current and future employment, and its impact upon the world of today and tomorrow.

Specialized courses also parallel instruction of resident schools of the Technical Training Air Force of the Air Training Command. Instructional material for these specialized courses resembles as closely as possible the resident programs of the seven Tech TAF bases, where a wide variety of technical and administrative specialties are taught. These specialized courses are designed to assist both officers and airmen to achieve mastery of their career fields and provide help in gaining advancement.

One ECI specialized course has approximately 20,000 students enrolled, of which 1,000 are officers. To the vast majority of enrollees in this course, ECI instruction represents the sole opportunity they have to acquire the fundamental knowledge required in an entirely new field of military science.

ECI courses originate at a "Preparing agency" designated by Headquarters USAF, which likewise approves determination of need for the course and the outline of its contents. The preparing agency is one of the various resident schools of the Air Training Command or the Air University or, in a few instances, an agency of the Air Force operating in the specialty being taught. ECI participates in this original production, too, by reviewing text and illustrations to improve organization, clarity and readability without disturbing subject matter or doctrine. ECI experts review tests and examinations for fairness, adequacy of coverage, sound construction, and accuracy. ECI editors finalize manuscripts for printing which is handled directly at Gunter Air Force Base or through contractors. Consequently, the finished product is a carefully designed text specifically created for ECI correspondence study.

Also through its facilities at Gunter Field, ECI handles the distribution of course materials to students who are located throughout the world. "Boxcar loads" of texts and instructional materials are sent out every day by this organization. Gunter Air Force Base is one of the largest, if not the largest, single user of the mails in the Montgomery, Alabama area. The 212,000 present enrollees route their test papers to Gunter where that organization accomplishes the grading (except for Air War College Extension Course). Records of the 140,000 graduates of ECI courses are maintained in the files of ECI. The vast detail of sustaining up-to-the-minute records on this sizeable student body and alumni is accomplished now by machine record processes which soon are to be supplanted by the automation of the "Univac process."

IV. Air War College Extension Course

The Air War College Extension Course Program was conceived in 1947 and organized as a working body in October 1949. Since its origin, the

stated purpose of the Extension Course Division of the Air War College was to provide professional training similar to that given in the resident Air War College for senior officers of the Regular Air Force, Air Force Reserve, and Air National Guard.

At the start, it was proposed to have the "course consist of two different parts: (1) a voluntary course for Air Reserves, Air National Guard, and Regular Air Force Officers; and (2) a proposed compulsory course for all Regular Air Force Officers and officers on extended active duty with the Air Force."[3]

The compulsory part of this program, while it received favor at some high USAF levels, has not been implemented to date.

The voluntary program began in the Fall of 1949. It consisted of a series of ten studies to be given over a period of five years, and designed so that a student would accomplish 150 hours of work per year.

On 25 June 1950, with the outbreak of hostilities in Korea, all U. S. military organizations were subjected to sudden and even drastic changes.

The affairs of the Air War College, like those of all U. S. Air Force commands, felt the impact of this development. Specifically, the Air War College during the closing six months of the calendar year 1950, reacted to four major developments. These were:

(1) Suspension of operations of the AWC and the resultant postponement of the opening date for the 1950-51 course of instruction;

(2) Revision of the resident curriculum;

(3) Revision of the school organization;

(4) Retirement of Major General Orvil A. Anderson, the School Commandant.[4]

While each and all of these developments had its effect on the Air War College Extension Course, the revision *of the resident curriculum,* originated in April 1950, was the most profound. At that time General Anderson's policy guidance ordered that the new course should cover three specific areas. "First, an area which he considered as a recognition of thinking—how to approach problems, and how to think. The second area would cover an evaluation of lessons of experience—appraisal of and diagnostic treatment of World War II. The third area would cover a projection of thinking into a strategic development of Air Force plans and programs."[5]

With the decision made that the Air War College Course would be of five and a-half months duration, a curriculum designed to General Anderson's specifications was approved and presented to the Air War College Resident Course of 1951-A.[6]

On 1 January 1951, Major General John de F. Barker, Deputy Commanding General of the Air University, was given the additional duty of Acting Commandant, Air War College. During his tenure as Commandant, revision of the Air War College Extension Course curriculum was implemented, again following the guidance and experience gained in the Resident Course.

As revised, the AWCEC Course now consists of five volumes of instruction designed to provide 150

[3] AWC History, January 1950 through June 1950, Chapter III, Extension Course Division (page not numbered).

[4] AWC History, July through December 1950, p. 1.

[5] AWC History, July through December 1950, p. 1.

[6] Duration of the resident AWC Course was re-established on a ten-months basis prior to June 1951, so that 1951-A was the only class shortened.

hours of study for each volume. Fifty reserve credit points are accredited per year to Reserve Officers for successful completion of a volume each 12 months. These five volumes presented the revised version of the course, up until recently, under the following titles:

Vol. 1—The Nature of Conflict.

Vol. 11—Command and Employment of Military Forces.

Vol. III—The Current World Conflict.

Vol. IV—War Planning, Programming and Related Air Force Problems.

Vol. V—Research Paper on Air Power.

The "Nature of Conflict" undertook an examination of the basic and underlying causes of conflict among nation states. This volume laid a foundation for succeeding course work. It directed a search for the foundations of national power and the instruments of power that nations employ in pursuit of national objectives.

"Command and Employment of Military Forces" presented in five parts, issued separately, embraces the following subjects: Allied strategy during World War II; problems of the Allied High Command in World War II; problems in the doctrine of Unified Command; comparisons of USAF and U. S. Navy air doctrine; and U. S. air doctrine in the Korean conflict.

"The Current World Conflict" deals with the factors comprising a strategic estimate and provides the opportunity for evaluating the courses of action available to the U. S. in the struggle against communism.

"War Planning, Programming and Related Air Force Problems" is concerned with the formulation of joint outline war plans, the feasibility testing of such plans, programming factors in war planning, and problems of command, organization, and examination of the fundamentals for an Air Force structure to accomplish national objectives.

"Research Paper on Air Power" is a thesis requirement on a subject dealing with some feature of air power or with a problem area confronting USAF concerning the development of air power.

Unlike other ECI courses, the Air War College Extension Course is not entirely self-contained in the listed volumes, which are outlines and study guides presenting only a small part of the required readings. These other readings are clearly identified and complete instructions on how to obtain them are given in the volumes.

The senior Extension Course seeks to encourage and stimulate creative thinking on the part of its students. No "school solutions" or absolute answers to problems are imposed. Each student's paper is given individual evaluation by a member of the Air War College Faculty, who must be a graduate of the Resident Course. Standards normally expected of a graduate student in a recognized university or college are maintained, which means that the thirteen student papers required throughout the course must be well written, logically presented and soundly documented.

Instructional materials for this, as well as all courses offered by ECI, are constantly undergoing revision. In this way students are assured that the instruction which they undertake on a "do-it-yourself" basis is fresh, vital and valuable.

Some text changes are effected through "errata" sheets attached to current manuals, others require supplementary or revised text publication. In the case of the Air War College Extension Course there has been a

gradual evolution in its curriculum emphasis in keeping with the changes manifested in the Resident Course. Increased attention is being directed towards factors and problems involved in national and military strategy of the Allies of the United States as well as non-allies, which includes so-called "uncommitted" areas of the world.

Consequently, in 1957, Major General Robert F. Tate, Commandant of the Air War College since 1956, approved a master plan for revision of the AWC Extension Course in progressive stages. Accordingly, a new 1957 edition of Volume I was prepared and has been in distribution since August of its year of publication. Now entitled "International Relations" the new book reflects latest curriculum developments in the Resident Course and provides fresh and current materials for student study and reference use.

Volume II, which will be retitled "Major Factors Affecting Current U. S. Military Strategy" is now being readied for approval and publication during the calendar year of 1958. Future revision plans and guidance have already been established for the remaining volumes of this instruction and will be implemented on a predetermined time schedule.

Revisions of these AWC Extension Course texts receive unusual professional and academic attention. Through the cooperation of the Air University Command itself, and several of its subsidiary organizations, the Air War College Faculty is able to present instructional material which has been selected from the best known sources as determined by several specialists, as well as the AWC Faculty itself. In addition to the Air University Headquarters, Research Studies Institute and the ROTC Headquarters have enabled leading college and university professors and bibliographical specialists to make significant contributions to this effort. The president of one of the leading universities in the West, together with a prominent Department of the Air Force Civilian Research-Bibliographer, participated in the revision work being conducted this year, illustrating the calibre of talent available to the Faculty in preparing this guidance for students of the AWCEC.

After reviewing the present and planned future curriculum of the AWCEC, one of the country's prominent educational leaders made the following observation:

"The effectiveness of the Extension Course program of the Air War College should not be judged solely on the basis of the number of graduates from this five-year course. All who complete any phase of the five-year course benefit to the extent of their effort. However, all reasonable efforts should and are being made to increase total enrollment to that limit possible under present organization with present personnel."[7]

Enrollment in the Air War College Extension Course is open to the following:

a. Officers of any component of the United States Armed Forces in the grade of Colonel, its equivalent, or higher.

b. Officers of any component of the United States Air Force in the grade of Lieutenant Colonel with 13 years of commissioned service.

c. Officers of any component of the United States Air Forces in the grade of Lieutenant Colonel who have com-

[7] Fourteenth Report of "The Board of Visitors" 3-7 March 1958, Air University, Maxwell AFB, Alabama, p. 4.

pleted the Command and Staff School Course or the Comand and Staff School Correspondence Course of the Air Command and Staff College.

d. Officers of the Army, Navy, Marine Corps, or Coast Guard who meet any of the above eligibility requirements.

Since the original offering of the course in the autumn of 1949 there have been approximately 1,000 enrollees. The largest number of students carried on the rolls at any one time was 750 in early 1957. However, since 1957 the Air War College in conjunction with ECI has sustained a program of maintaining close scrutiny of student participation in this course. Students are eliminated from the active roster for nonparticipation if no work is submitted for a period in excess of one year. Students have withdrawn and may withdraw for a variety of reasons and may be reinstated to active participation at a future date upon request.

Composition of the Air War College Extension Course student body on 30 June 1958 was made up of the following officers:

USAFR	280
USAF	75
U. S. Army	6
U. S. Navy	1
Air Nat. Guard	12
CAP	6
Total	379

Included in this student body are several distinguished officers on active duty. Several have responsibilities such as Wing Commanders or serve in staff positions of critical national importance. Their participation in this course attests to the fact that devoted and dedicated members of the Armed Forces can somehow manage to improve their education despite busy schedules. Among the Reserve Officers enrolled are four general officers who are well along in the course and whose civilian and military pursuits are managed to successfully handle the study required.

A U. S. Senator, who is also a USAF Reserve Colonel, is currently well along in Volume V, the final thesis assignment, which will earn him a diploma upon completion. Starting this course in 1953, he has been an outstanding student and has completed each assignment with competence and punctuality. A busy insurance broker and tax consultant of Sweetwater, Texas, a graduate of all the other general courses offered by ECI, is now readying his final thesis prior to graduation from AWCEC. These officers and many of their colleagues in the AWCEC have solved the problem of accommodating busy personal and professional activities into a schedule which allows them to participate in this high level educational opportunity offered free of charge by a prudent Air Force.

There are approximately 30,000 officers on active duty alone who, it is estimated, are eligible to take the AWCEC course. This total is vastly increased when those in Reserve status, likewise qualified, are taken into account. In light of this potential, how many will the Air Force accommodate in this program? One study group estimated that an annual output of 450 Air War College Resident school graduates would be needed to fulfill the world-wide requirements of the USAF. In 1958 there were only 130 Air Force Officers who graduated from the Resident Course. Using this single year's experience as the criteria (previous year's experience is virtually the same), it would be desirable to have 320 officers similarly educated to make up the annual deficiency.

The AWCEC does not provide identical instruction to that given in the Resident School, but it does provide a similar level of instruction utilizing different educational techniques. Consequently, an annual output of 320 AWCEC graduates would go a long way in providing the Air Force with the desired number of officers educationally prepared to manage and direct military affairs successfully at high levels, both at home and abroad.

No reliable data exists which would predict with an acceptable degree of accuracy the number of enrollees required to produce 320 graduates annually from this five-year course. Even a "horseback" guess would be a fruitless approach to the solution of the problem.

What is fruitful to consider, however, is that all officers eligible to take this course should seriously consider what AWCEC instruction can mean to their individual careers and personal intellectual enjoyment; — and, more importantly, what participation in this instruction can mean to their personal contribution to the safety and well-being of this nation. Participation can hardly fail to improve the capabilities of any student to more effectively meet his responsibilities as a senior officer of the U. S. military establishment.

The Air Force, through its Air War College and Extension Course Institute, has provided in this course an educational opportunity of considerable significance as judged by a number of highly competent military and civilian critics. General Robert Tate and his Faculty, in conjunction with the facilities of ECI, have made enrollment and participation in this course as available as the nearest mail box or APO.

Some observers feel that the second decade of Air War College Extension Course operations will vastly exceed previous experience records. It is becoming increasingly clear that the knowledge available in this course of instruction no longer is regarded as a luxury by some commanders, but has become a necessity of military life.

AIRMAN'S BIBLIOGRAPHY

Mission Completed, by Air Chief Marshal Sir Basil Embry, New York: F. Praeger, 1958, 350 Pages, Illustrated, $5.50

This book would not have had to be written to place the illustrous record of Sir Basil Embry prominently in the annals of the Royal Air Force. Yet the literature of air power is the richer for having his memoir.

Rated by superiors and contemporaries as one of the better pilots of his generation, Basil Embry began his career in the early years of the world's first autonomous air force. When he retired in 1955, he was Commander - in - Chief Allied Air Forces, Central Europe. Embry served his tours flying policing missions in the "Air Control" of Iraq (1922-27), instructing in the Central Flying School (1927-33), and commanding No. 20 Squadron in India during

the close-support of army columns in the Waziristan campaigns of 1937 and 1938. In the Air Ministry "complete with bowler hat and umbrella" at the outbreak of World War II, Embry chaffed for action. His wishes were fulfilled.

The story of Embry's series of captures and escapes after being shot down in the Battle of France in 1940 has been frequently told and need not be recounted here. He was one of the few airmen of public note during the dark days immediately following the catastrophic evacuation at Dunkirk. His own account of his personal war against the Germans in getting back to England is documented in this volume without immodest embellishment, but with useful commentary on the art of successful escape and evasion. His subsequent World War II exploits cover his command of one of the first A.I. night fighter wings during *Blitz* (to get which he took a demotion in grade), his tour as "Mary" Coningham's Senior Air Staff Officer in the Desert Air Force Headquarters in North Africa, his successful efforts in getting the first ground-control radar set and Spitfires to Malta, and his tactical bomber commands during the rest of the war. It was Sir Basil's Number 2 Group which executed some of the most difficult precision low-level attacks of the war such as the destruction of the Gestapo headquarters at Aarhus, Copenhagen, and Odeuse, and OPERATION JERICHO (which liberated 258 Frenchmen condemned do death). After the war, Embry was Commander-in-Chief of Fighter Command for four difficult years prior to his taking his NATO post. Sir Basil confesses that in his 35 years of service he was most frustrated (mainly because of the lack of realism regarding air atomic realities among his army colleagues) while commanding Allied Air Forces, Central Europe, as the successor of General Lauris Norstad.

The full historical measure of Sir Basil Embry, always outspoken and a man of action, comes out in interesting details throughout his narrative. He was first and always a fighting airman. He was impatient with limitations in equipment or shortcomings in organization. He points out that instrument flying was virtually unknown in the RAF until 1931, that no land plane of the RAF was permitted to fly out over sea until 1934, and that the art of navigation was exceedingly slow in development. He consistently insisted that commanders must fly combat operations (Embry was 37 years of age when World War II began), a strong belief he described as follows:

> I believe that all Commanders subordinate to a Commander-in-Chief must have firsthand practical experience of flying the aircraft of their commands. They must personally understand the operational capabilities and limitations of the aircraft, weapons, and equipment placed in their charge. They must also have this knowledge to be able to assess the problems and anxieties of their aircrew—these are the ingredients of command. This also applies to Staff Officers holding key positions.

And Sir Basil's comment on headquarters staff organization is an equally firm view:

> If one views objectively the present-day [1957] methods of dealing with our [Air Force] affairs, I think we must consider ourselves fortunate that they were so different before 1939. To-day staffs in Whitehall are swollen to the point of indecency, and progress is clogged by an almost impenetrable undergrowth of co-ordinating officials, who thrive on endless committee work and carry no direct responsibility for the defense of the Realm. Many believe that had we had to carry such a handicap in the years before the war, the swastika might to-day be flying over Whitehall.

There are other marks of distinction in Sir Basil Embry's career but his well-written volume should be read for itself. Here was an airman with a driving sense of purpose, who waged constant combat against apathy and inaction, who, as a commander, regarded morale as the lynch-pin of efficiency and fighting spirit.

EUGENE M. EMME
Office of Civil and Defense Mobilization

GREAT FLYING STORIES, edited by Frank W. Anderson, Jr., Captain, USAFR, New York: Dell Publishing Co., Inc., 1958, $0.35.

When the highbrow Managing Editor of the *Air University Quarterly Review,* an intellectual in Air Force matters, was asked to compile an anthology of flying stories, he simply reached into his lowbrow pockets (or wherever he hides his pocket books) and from the extensive background of his omnivorous reading readily made his selections. The result is one of the most entertaining volumes of flying stories, and certainly one that everyone can afford.

The full impact of the work defines the coming of age of the Flyer. Hence the division of the stories into: Childhood, Adolescence, Early Manhood, and Maturity. Some will not agree as to the placement of the stories; indeed in some respects all stories dealing with World War II, to my notion, should belong in the Maturity category; but for the general reader this division should not matter. One can start reading the stories anywhere in this handy pocket book. For our review purposes we disregard these categories.

A masterpiece of short-story writing opens the work, "Turnabout" by William Faulkner. It deals with the nonchalant heroism of American flyers and British torpedo-boat men during World War I. This is entertainment at its best. "The Greatest Man in the World" by James Thurber describes the imaginary whimsical tragedy of a shady character becoming overnight a great aviation hero.

Other stories capture the skepticism voiced during and after World War I, like "More About the War Birds" by Elliott White Springs. This mood coincided with the "roaring twenties." The depression is covered partially in "Air Circus" by Hart Stilwell and Slats Rodgers, and also in the selection "Refueling in the Air" by Lou Reichers that describes an endurance contest in which flyers were paid three dollars an hour (?) for staying in the air in one of the first refueling operations.

Connected with tactics and instruments are several other stories—"Flying Blind" by Wolfgang Langewiesche depicting the end of flying "by the grace of the weather," ushering in the use of the gyroscope, and the growing faith in instruments. Lindbergh's pioneering flight to Paris also emphasizes this phase.

The flyer's fantastic struggle against weather is dramatized in "The Elements" by Antoine Saint-Exupéry, in his account of a flight through a storm in the Patagonian Argentine and the gruesome effect on his senses. "Trapped" by Ernest K. Gann tells about an uneven struggle with the weather ending in the pilot's death.

On the factual side, several stories deal with the development of tactics and techniques. We mentioned Lou Reichers and refueling. In "Anti-Submarine Attack" by Hector Bolitho we relive the first destruction of submarines from the air. "Leipzig" by Bert Stiles recounts an attack by bombers (B-17's).

"Major Blatt" by Hugh Fosburgh relates a tale of modern navigation against a South Pacific background. "The Needle" by Guy Murchie and "Peacetime Interlude" by Fleming McLiesh deal also with the intricacies of modern navigation. And perhaps another category is found in "Korea" by Walt Sheldon and "The Jet That Crashed Before Take-Off" by Beirne Lay, Jr., stories of the new jet flying and the tremendous impact its speed and hazards have on the individual.

But whatever categorizing one might make of these stories, be it didactic, aesthetic, or by subject matter, the whole effect of them is good entertainment. Fact or fiction, they picture the glorious efforts of man to fly—terrestrial man in the air ocean conquering time and space! And though we might smile at the heightened emotionalism of the World War I flyers, or at their comic barn-storming during the twenties, these flyers helped to achieve the Air Corps Tactical School's master plan which when put into practice gave us air supremacy and victory in World War II.

JOSE MANUEL TOPETE
Air University
Maxwell AFB, Ala.

Recent Books

* Anderson, Frank W., Jr., *Great Flying Stories,* New York: Dell Books, 1958. $.35. This is a paper cover edition of some of the finest flying stories gathered together and edited by Dr. Anderson.

Bergaust, Erik, *Rockets and Missiles,* New York: Putnam, 1957, $2.00.

Burgess, Eric, *Guided Weapons,* New York: Macmillan, 1957, $5.00.

Cox, Donald, *Spacepower,* New York: Winston, 1958, $4.50. The human aspects—social, military and legal—of man's race for the moon and stars.

Davison, W. Phillips, *The Berlin Blockade; a Study in Cold War Politics,* Princeton: Princeton University Press, 1958, $7.50. A survey of the psychological and political effects of the Berlin Airlift.

Eliot, George F., *Victory Without War, 1958-1961,* Annapolis: U. S. Naval Institute, 1958, $2.00.

*Embry, Air Chief Marshal, Sir Basil, *Mission Completed,* New York: F. Praeger, 1958, $5.50. Autobiography of Britain's famous fighting airman.

Epstein, Beryll Williams and Samuel Epstein, *The Rocket Pioneers,* New York: Messner, 1958, $3.75. Biographical sketches of men from Jules Verne to members of the Peenemünde group whose genius paved the way for rocket progress.

Finletter, Thomas K., *Foreign Policy: The Next Phase, New York:* Harpers, 1958, $3.50.

FitzGibbon, Constantine, *The Winter of the Bombs,* New York: Norton, 1958, $3.95. A well-written narrative of the Luftwaffe's "Big Blitz" on London.

Garthoff, Raymond, *Soviet Strategy in the Nuclear Age,* New York: Praeger, 1958, $4.50. Soviet strategists consider the aircraft carrier obsolete and place reliance on a surface fleet of 27 cruisers, 150 destroyers and a great submarine strength.

Heuer, Kenneth, *The Next Fifty Billion Years,* New York: Viking, 1958, $3.00. Our globe and the possible circumstances under which it might end its currently four-billion year old existence.

Howard, Michael, *Soldiers and Governments, Nine Studies in Civil Military Relations,* London: Eyre and Spottiswoode, 1957, $3.00. Covers the problem in various countries.

Hyde, Margaret Oldroyd, *Exploring Earth and Space,* New York: McGraw-Hill, 1957, $3.00. The story of the International Geophysical Year.

Kintner, Col. William R. and others, *Forging a New Sword,* New York: Harper, 1958, $4.50. An analysis of the national defense organization in relation to the job to be done showing strengths and weaknesses.

Melman, Seymour, *Inspection for Disarmament,* New York: Columbia University Press, 1958, $6.00.

Mills, Walter, *Armies and Men;* a study of military history, London: Jonathon Cape, 1958, 25s. net. A commentary on the evolution of American military policy and arms organization.

Moore, Col. Samuel Taylor, *U. S. Air Power,* New York: Greenberg, 1958, $5.95. A history of the U. S. Air Force with a unique personal touch.

Rigg, Col. Robert B., *War - 1974,* Harrisburg: Military Service Co., 1958, $5.00. Attempts an indication of a military technique to come based on actual developments.

---

* Reviewed in this issue.

Slim, F. M. Sir William, *Defeat into Victory,* London: Cassell, 1957, 25s. A readable and detailed story of the British retreat from Burma after the fall of Rangoon and the campaign for the recapture of Burma.

Soviet Progress vs. American Enterprise; Confidential briefing papers prepared for the Committee on Economic Development. New York: Doubleday, 1958, $2.00. Analyzes the Soviet challenge in economics, science and education.

Stine, George Harry, *Rocket Power and Space Flight,* New York: Holt, 1957, $3.75. Present achievements and future programs of research.

Teller, Edward, and A. L. Latter, *Our Nuclear Future,* New York: Criterion, 1958, $3.50.

The United States Air Force Report on the Ballistic Missile, New York: Doubleday and Co., Inc., 1958, $4.00. This is the hard cover edition of the material presented by the Air University *Quarterly Review,* Summer, 1957, edited by Lt. Colonel Gantz.

Wassenbergh, H. A., *Post-War International Civil Aviation Policy and the Law of the Air,* The Hague: Nijhoff, 1957, G. 11.50. (11.50 Guilders)

Watkins, Richard, *The Challenge of the Sputniks,* New York: Doubleday, 1958, $1.50. A collection of post-Sputnik writings of outstanding American statesmen, businessmen, government leaders and scientists with editorial comment.

Yool, Air Vice Marshal W. M., "The Evolution of Strategic Bombing," in *Brassey's Annual,* 1957, New York: Macmillan, 1957, pp. 95-105.

Recent Articles

Ackeret, J., "Science as a Basis of Aviation," *Interavia,* Vol. 13, June 1958, pp. 542-543.

"Air Force Almanac," *Air Force,* Vol. 41, August 1958. Anniversary issue devoted to Air Force commands, weapons, research plans.

"Air Power in Theory and Practice," *Interavia,* Vol. 13, June 1958, pp. 535-541.

"Asia and Future World Leadership," Special issue of *Current History,* Vol. 318, July 1958.

"The Atlas Story," *Interavia,* Vol. 13, May 1958, pp. 431-433.

Chassin, Gen. L. M., "From Douhet to the Deterrent Concept," *Interavia,* Vol. 13, June 1958, pp. 534-535.

Ferguson, Maj. Gen. James, "Operational Future of Manned Aircraft," *Air Force,* Vol. 41, April 1958, pp. 42-44.

Hersey, Irwin, "National Astronautical Program Begins to Take Shape," *Astronautics,* Vol. 3, July 1958, pp. 20-23.

"Just Ahead—A Shot at the Moon," *U. S. News and World Report,* August 8, 1958.

Krauskopf, R. W., "The Army and the Strategic Bomber, 1930-1939," *Military Affairs,* Summer, 1958.

Leavitt, William, "The Edge of Space and Beyond," *Air Force,* Vol. 41, August, 1958, pp. 82-85. Air Force investigations into space problems. Includes milestones toward man in space.

Leghorn, Richard S., "The Problem of Accidental War," *Bulletin of the Atomic Scientists,* Vol. 35, June 1958, pp. 205-209.

Morton, Louis, "The Origins of American Military Policy," *Military Affairs,* Summer, 1958.

Munro, Sir Leslie, "The Case for a Stand-

ing U. N. Army," *New York Times Magazine*, July 27, 1958, pp. 8+.

"A Quarter Century of Military Aviation," *Interavia*, Vol. 13, June 1958, pp. 534-541.

Rabinowitch, Eugene, "Accidental War, Missiles and World Community," *Bulletin of the Atomic Scientists*, Vol. 14, June 1958, pp. 202-204. Public opinion has no right to close its eyes to the increasing possibility that an all-destructive nuclear war can break out without anybody deciding to start it.

Ransom, H. H., "The Politics of Air Power," in *Public Policy*, (Harvard University Press, 1958), pp. 87-119.

Richardson, Col. Robert C. III, "Force in Being—The Weapons," *Air Force*, Vol. 41, August 1958, pp. 52-55. Weapon systems developed and operated by the Air Force.

"The Soviet Union: Education at Mid-Century," Special issue of *Current History*, Vol. 35, July 1958.

Strughold, Hubertus, "Spatiography: Geography for Space," *Missiles and Rockets*, Vol. 3, May 1958, pp. 106+.

Taylor, John W. R., "Air Power in the 1960's," *Flight*, Vol. 73, June 20, 1958, pp. 843-847.

Taylor, John W. R., "Forty Years of Independent Air Power," *Air Power*, Vol. 5, Spring 1958, pp. 183-191. The RAF was the first independent air force in the world and it introduced a completely new concept of military aviation, strategic bombing.

White, Gen. Thomas D., "Space Control and National Security," *Air Force*, Vol. 41, April 1958, pp. 80+.

NEWS ITEMS

News of the 5th Annual Meeting of AFHF

Old-timers and relative Air Force youngsters gathered together for the 5th Annual Meeting of THE AIR FORCE HISTORICAL FOUNDATION on Friday, 5 September, at Bolling AFB, Washington, D.C. Occupying a singular position of honor at the meeting was the oldest living aviation pioneer, Brig. Gen. Frank Purdy Lahm (Ret).

Our president, Maj. Gen. Benjamin D. Foulois (Ret) was unable to attend the meeting for the second straight year because of the serious illness of his wife. Lt. Gen. Idwal H. Edwards (Ret) sat in the Chair in his absence. All other officers of the Council were present.

The following were elected to serve a four-year term as Trustees at the meeting: Maj. Alexander P. deSeversky, Gen. Otto P. Weyland, Lt. Gen. Ira C. Eaker (Ret), Mr. Marvin W. McFarland, Mr. Richard Boutelle and Mr. C. V. Whitney.

Besides the election of Trustees, several other items of business were discussed at the morning session of the combined meeting of the Board of Trustees and the Executive Council, as follows: the selection of additional members to the Board of Editors, namely: Dr. Stefan Possony, Mr. Steve Leo and Col. John A. McCann; a discussion on the advertising campaign; the membership, and membership drives; securing writers and authors for the publication; the selection of a committee to study the problem of determining who the real "pioneers" of military aviation are; a continuing study for suggested revisions to the Constitution; and the selection of a committee to determine outstanding "air" dates of the year. In addition, it was

tentatively decided to hold the next annual meeting at Maxwell Air Force Base, in Montgomery, Alabama, sometime during the middle portion of September, 1959.

Following a luncheon, Maj. Gen. Sam Donnelly (DCS, Operations) presented a discussion on the President's Reorganization proposal for the Defense Department. At the completion of the afternoon session, a small cocktail party was enjoyed by those who were able to remain.

Claire Lee Chennault

With the same courageous and indomitable spirit that characterized his active military career, Lieutenant General Claire L. Chennault fought his battle against an incurable form of lung cancer until his death on Sunday, 27 July, 1958 at the Oeschner Foundation Hospital in New Orleans, Louisiana.

General Chennault, a Life Member of The Air Force Historical Foundation, became an early apostle of Air Power and a dedicated advocate for a sound military posture in its tactical features and balance. He sensed the need for combat features in the air weapon system to successfully

Credit: U. S. Air Force

This photo of Capt. Claire Lee Chennault was taken on Oct. 29, 1934, at Maxwell Field, where as an instructor in pursuit tactics in the Air Corps Tactical School, he formed and led the famous "Men on a Flying Trapeze,' aerial stunt and precision flying team, using P-12 airplanes.

wage air war, and became the chief exponent in the fighter aircraft cause. However, in the preparatory phase for World War II, his was "the voice of one crying in the wilderness," so he had to wait for hindsight to expose the validity of his views.

Another display of the soundness of his thinking, during a stormy but colorful career, was the stand he took on China. Sensing the demands of objective strategy he fought for a course of action that would preserve Nationalist China as a continental power oriented to the free world cause. Again his counsel was ignored and we lost a continental ally by default while we were processing appeasement policies at conference tables. Passing time again produced the vantage point of hindsight which proved his thinking sound. But hindsight couldn't retrieve the losses that a short-range foresight could neither see nor comprehend.

But Claire Chennault was endowed with an even greater virtue,—the courage to act in response to the demands of reasoned thinking, regardless of how unpopular that cause might be. This response to moral dictate on major issues characterized his military career and placed him high on the honor role of airmen.

The Air Force paid a fitting tribute to this great man when they renamed Lake Charles Air Force Base to honor the memory of this famous Air Force personality, Lieutenant General Claire Lee Chennault.

National Air Museum Building

The Board of Regents and Secretary of the Smithsonian Institution and the Advisory Board and Director of the National Air Museum are pleased to announce the signing by President Eisenhower of the bill passed by Congress authorizing the preparation of plans and specifications for a National Air Museum building. Our organization and members will share the pleasure in this big step toward adequate housing for the preservation and display of the famous "firsts" in aviation.

The site designated in the law for the new building is on the Mall in Washington directly opposite the National Gallery of Art. It is bounded by Independence Avenue and Jefferson Drive and Fourth and Seventh Streets, S.W. This is an ideal location, within walking distance of the Capitol Building, the Washington Monument, and the other great museums of the Smithsonian Institution which last year received more than five million visitors!

The building for the Smithsonian's National Air Museum will be unique in many respects. It will be the first ever designed solely for the exhibition of aircraft. It will memorialize the persons and machines through which America gave wings to the world. It will be a living reference for the inspiration and education of the youth of America—in whom we place our trust for the continued development of the cultural, scientific, and economic phases of air and space power.

In undertaking this task of planning we are mindful of the contributions which the aviation industry and all who work in aviation have made in laying the groundwork for it. The Smithsonian invites, and will welcome, your suggestions and your continued interest in and cooperation with the National Air Museum.

Transatlantic Flights

As part of the additional features for the air shows of Belgium's World Fair festivities, two SAC KC-135s established new speed marks across the Atlantic from west to east, and east to west. The trip to England from Westover AFB took five hours and 27 minutes, and the return trip required five hours and 51 minutes.

The record flights were marred by the crash on take-off of a third KC-135 which took the lives of the seven crew members including that of Brig. Gen. Donald W. Saunders, who was commander of the 57th Air Division, and nine civilians. Because of this tragedy the attempt to break the round-trip record from the United States to England and return in the same day, was cancelled.

Several days after the KC-135 runs, four F-101s from the Tactical Air Command flew

nonstop from Andrews AFB, Maryland to Belgium to participate in the air show at Liege, Belgium. The flight of the F-101s required six hours and 12 minutes.

Flying Time — 3,000,000 Hours, Jet

Without fanfare, and almost unobserved, was a notice released by SAC in July that in May they had achieved their third million operational jet flying hours. In commenting on this record, General Thomas S. Power, SAC Commander-in-Chief, stated that this record has probably never been approached by any operational unit in the world.

For the greatest portion of its short existence since 1946, SAC has been flying conventional type aircraft, and considering the relatively short time that SAC has been operating with jets, this is an amazing number of hours to be logged.

While SAC is now working on its fourth million hours, General Power further stated that SAC is now in the process of passing on to civilian agencies the information and lessons which have been learned during the jet operational time.

1957 Mackay Trophy Award

The Mackay Trophy, first established by Clarence H. Mackay on 27 January 1912, competed for annually by aviators under rules made each year, or awarded by the War Department or Defense Department for the most meritorious flight of the year, was won by the 93rd Bomb Wing in 1957.

In August of this year Gen. Thomas D. White, Chief of Staff, presented the trophy to the personnel of the 93rd through Gen. Thomas S. Power, SAC Commander-in-Chief, for the first nonstop jet flight around the world. On hand for the award were: Maj. Gen. Archie Old, Jr., 15th Air Force commander who led the flight; Brig. Gen. William E. Eubank, 93rd commander at the time of the flight; Brig. Gen. John M. Reynolds, present chief of the Castle AFB outfit; Lt. Col. James Morris, Maj. Charles W. Fink and Maj. George Kalebaugh, aircraft commanders; Col. Robert Schaefer, Lt. Col. Patrick E. Montoya and Maj. Gordon Hanaford, planning officers.

In January 1957, the three Stratofortresses left Castle and flew 24,235 miles around the globe, landing at March AFB, California, 45 hours and 19 minutes later. They averaged 543 miles per hour through all kinds of weather.

The first Mackay Trophy was won by Lt. H. H. Arnold, the only contestant, on October 9th, 1912. The second trophy was won by Lts. J. C. Carberry and Fred Seydel in a reconnaissance flight at San Diego, California, on December 29th, 1913.

LETTERS TO EDITOR . . .

Dear General:

. . . With reference to your inquiry regarding *The Air Power Historian*, it is the only publication I read from cover to cover—enough said? I pass it around to other officers, and it is one thing I make it a point to get back!! I have every issue and am keeping them until I have enough to have them bound.

I like the personal accounts by the men who did so much to make our air force what it is today. The more of them you print—the better, as far as I'm concerned.

Sincerely yours,

C. T. BRISTOW
Major, USAF
McClellan AFB, Calif.

Dear General:

I have read your review of my book, *The Zeppelin in the Atomic Age*, in the Air Power Historian. I regret to observe that some of your facts are off base. In regard to the Akron disaster, my information was sifted and tested from many sources, i.e., Congressional investigations, ACC reports, etc. On other items which you scored, I believe it would be a matter of one's choice of words.

Further, the book was not intended to be a detailed exposition on the subject, but contained itself within the scope stated in the Preface.

I have the impression that you have a chip on the shoulder when it comes to lighter-than-air subjects. You talk about the future airship in terms of the 1920-30 aircraft, including airplanes. Technology in this field has improved the airship like the airplane (as shown by the recent flight to the North Pole and other extreme flight tests). Billy Mitchell supported strongly the lighter-than-air utilization, and I believe he would have frowned upon some of your views.

I am sorry that I have to write a letter in this vein, but I have a feeling that your mind on this subject has been set for a couple of decades.

Sincerely,

EDWIN J. KIRSCHNER
Washington, D. C.

Dear General:

I have no reasonable excuse for my failure to meet my obligations as regards the Foundation. Enclosed is a check for the amount mentioned in your letter. I assure you that this situation shall not recur.

Your patience in this matter has left me with a feeling of guilt on the one hand and gratitude that you have not seen fit to strike me from the roster on the other.

I am particularly pleased and interested in the editorial policy expressed in the *Historian*. It is unfortunate that in these critical times there are not more publications which examine present military policy with a critical eye.

Respectfully,
(Signature deleted
by Editorial policy)
Captain, USAF
Otis AFB, Massachusetts

Dear Sir:

. . . I was on duty with the 334th Fighter-Interceptor Squadron in Korea when the fund drive for the Air Force Historical Foundation began. When I first heard of the fund drive, I was very eager to contribute. One week later, all the officers in my squadron received a mimeographed letter from the Commander, Fifth Air Force, requiring a reply by indorsement of our intentions of contributing, and the amount. The Squadron Commander called a meeting and levied a quota on each man. It was the most sordid meeting of my Air Force career to date. I swore, after making my "contribution" under protest, that I would not contribute another cent.

Time rolled by. The copies of the HISTORIAN began to arrive, and I realized that the results of my contribution were better than the means used in collecting. I am proud of belonging and will continue without prodding; although the honor of receiving a letter from you is greatly appreciated.

We are making history here with the new F-104. Please consider an invitation to visit our unit and see the best airplane to enter the Air Force inventory.

Respectfully,
(Signature deleted
by Editorial policy)
Captain, USAF

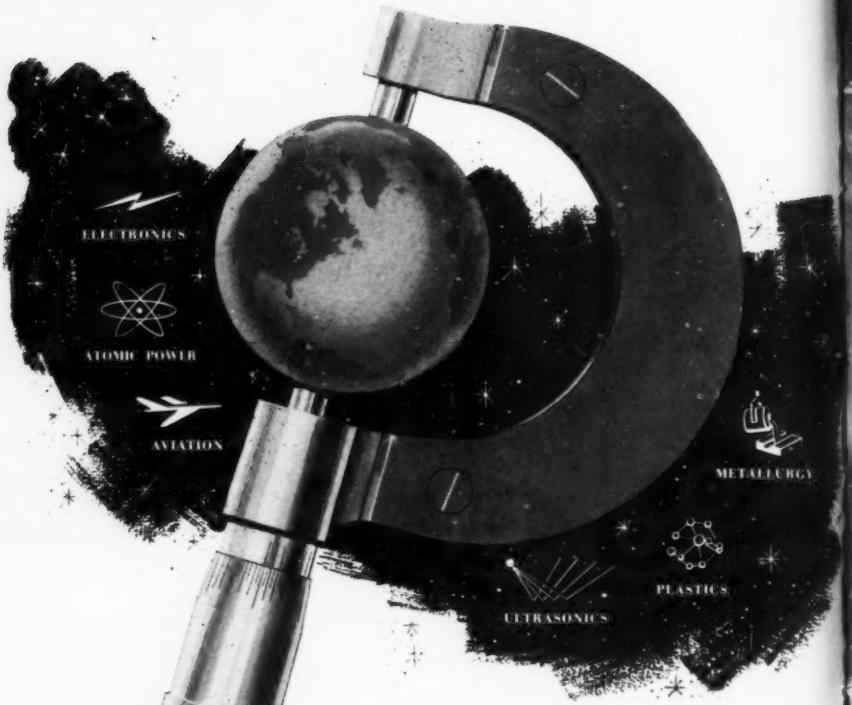
A MAILING ERROR

Through a slip in our mailing procedure, a small group of members were sent a second copy of the April '58 issue of THE AIR POWER HISTORIAN instead of the July edition. Please inform us if you are one of those members, as we would like to furnish you with your copy of the July issue.

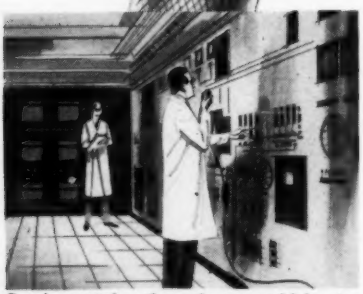
Peace is his profession

For more than a decade the officers and airmen of the United States Air Force *Strategic Air Command* have waged *peace* with all the vigor and resolution the military once gave only to war. The survival of our civilization in which freedom of religion, education, art, science and government flourishes, depends today upon the men who are practicing *peace* as a *full-time* profession. In this restless world these professional men are actively dedicated to our way of life!

PUBLISHED AS A PUBLIC SERVICE BY **CONVAIR**, A DIVISION OF GENERAL DYNAMICS CORPORATION



Taking the measure of tomorrow...



Developments from the modern research laboratories of Curtiss-Wright serve many industries today—lay the groundwork for future achievements.

An airplane powered by a Curtiss-Wright engine has flown so fast that a noon take-off in New York would land it in California at 10:20 A.M. same day—turning back the clock!

A Curtiss-Wright nuclear gauge measures the thickness of fast moving sheet materials during production—without touching them.

Curtiss-Wright produces a heat-registering paint for recording the temperatures of working parts in action.

The fields of Curtiss-Wright activity are continually broadening, and now include products for nearly every major industry . . . products of imaginative engineering in electronics, atomic power, plastics, metallurgy, ultrasonics, aviation . . . products of Curtiss-Wright research that continually take the measure of tomorrow.

Research by **CURTISS-WRIGHT**

CORPORATION • WOOD-RIDGE, N. J.

Divisions and Subsidiaries of Curtiss-Wright Corporation:

Wright Aeronautical Division, *Wood-Ridge, N. J.* • Propeller Division, *Caldwell, N. J.* • Curtiss Division, *Quehanna, Pa.* • Electronics Division, *Carlstadt, N. J.* • [illegible] Processing Division, *Buffalo, N. Y.* • Specialties Division, *Wood-Ridge, N. J.* • Utica Division, *Utica, Mich.* • South Bend Division, *South Bend, Ind.* • [illegible] Division, *New York, N. Y.* • Caldwell Wright Division, *Caldwell, N. J.* & *North Hollywood, Calif.* • Aerophysics Development Corporation, *Santa Barbara,* Research Division, *Quehanna, Pa.* • Industrial and Scientific Products Division, *Princeton, N. J.* • Curtiss-Wright Europa N. V., *Amsterdam, Netherlands* • Marquette Division, *Cleveland, O.* • Canadian Curtiss-Wright Ltd., *Montreal, Quebec, Canada* • Propulsion Research Corporation, *Santa Monica,*

reliability

is our
prime requisite

It has been noted in recent government reports that the basic reason behind unreliable weapons, whether manned or unmanned, rests primarily with the performance of electronics.
Maj. Gen. David H. Baker, President of Capital Airlines and until recently the Director of Procurement and Production, Air Materiel Command, stated "It is becoming increasingly evident that in the selection of weapons or components in a competitive situation, the blue ribbon will go to the company which has recognized **reliability as the prime requisite** in his product."

WORLD'S LARGEST MANUFACTURER OF GLASS-BONDED MICA AND CERAMOPLASTIC PRODUCTS

SINCE 1919 MYCALEX® THE INSULATOR

THE FIRST SYNTHAMICA® SYNTHETIC MICA

THE FIRST SUPRAMICA® CERAMOPLASTIC

MYCALEX
CORPORATION OF AMERICA

GENERAL OFFICES AND PLANT:
CLIFTON BOULEVARD
CLIFTON, NEW JERSEY

EXECUTIVE OFFICES:
30 ROCKEFELLER PLAZA
NEW YORK 20, NEW YORK

SALES OFFICES:
CHICAGO — DAYTON
LOS ANGELES — MIAMI
WASHINGTON

A CONCEPT OF SCIENCE

Five years ago, The Martin Company conceived a unique undertaking in the field of pure science which grew out of a belief that our own and our country's resources in creative scientific research must be greatly enlarged and cultivated.

We believed that the country—and the Company—that concentrates on short-range material achievements, without a deep concern for the creative source of tomorrow's even greater achievements, will have no tomorrow.

It is now three years since that belief motivated management's action with the foundation of a program in pure research. Known as the Research Institute of Advanced Study, RIAS is now a substantial organization staffed by scientists who are working in many fields, including theoretical physics, biochemistry, metallurgy and mathematics, without short-range applied research requirements.

Today, the increasing appeals to industry and the nation for accelerated activities in basic research give the RIAS story a special significance. For creative research in pure science is the true life source of our technological security—the "seed bed" from which our national strength shall continue to grow.

MARTIN

BALTIMORE · DENVER · ORLANDO